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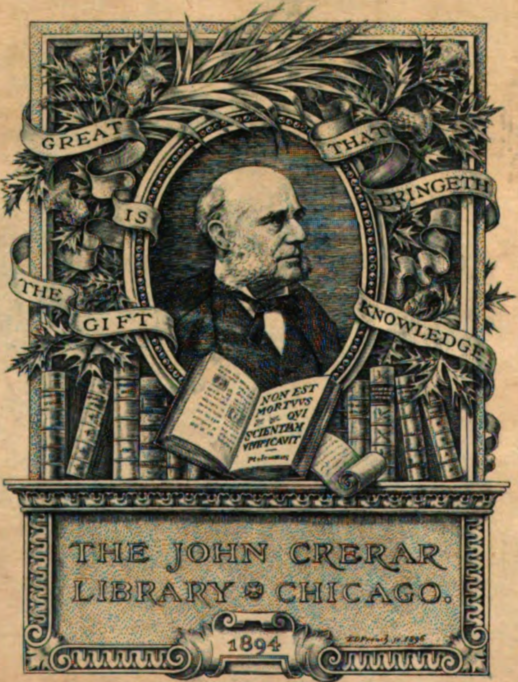
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1894

The

Process Engraver's Monthly

("The Process Photogram")

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An asterisk (*) denotes an illustrated article.

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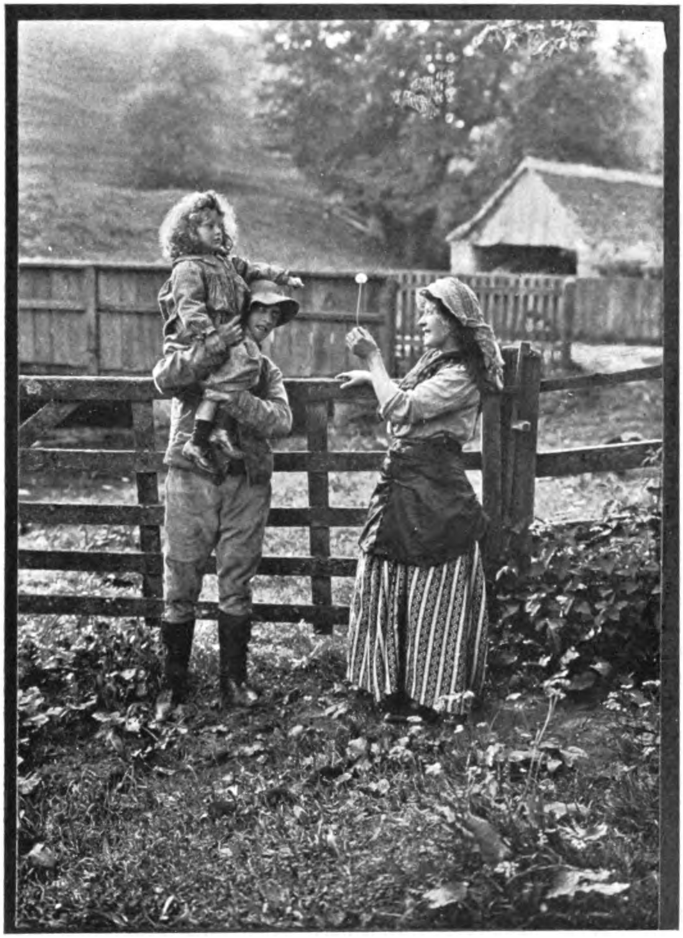
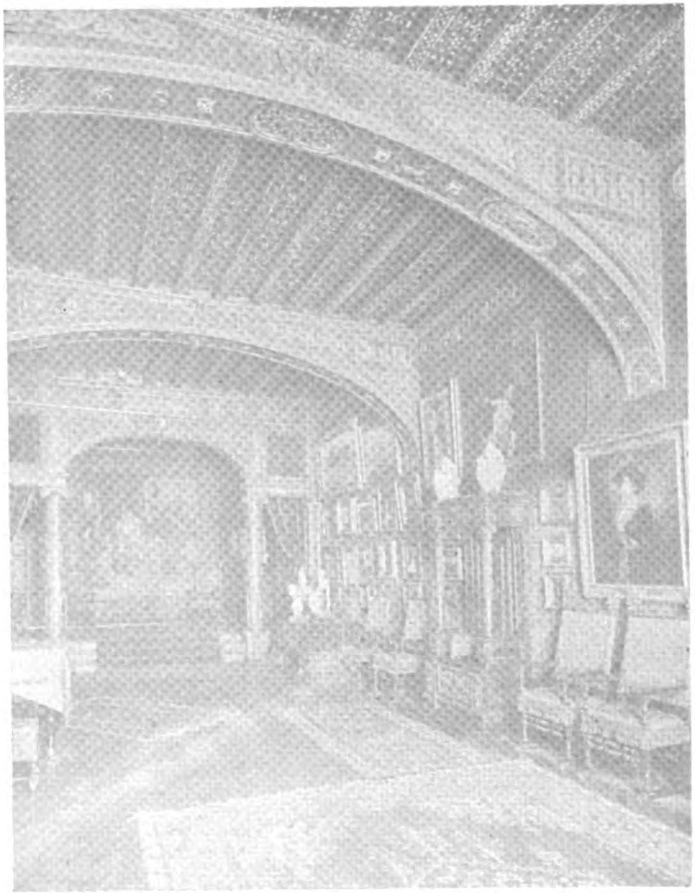
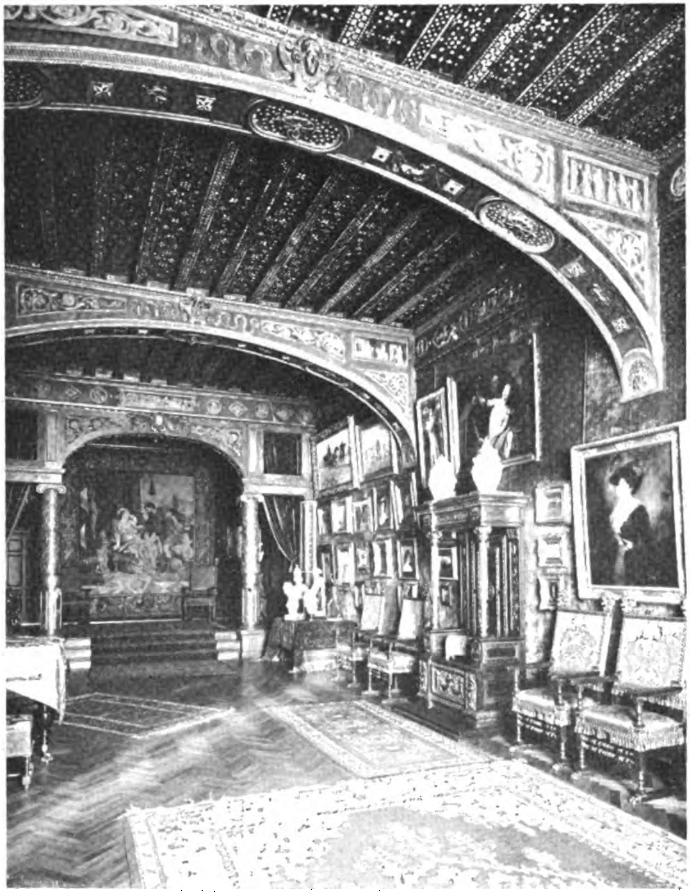


THEIR JOY AND PRIDE. *Copyright by Graystone Bird.*

Print from the first plate made in Dr. Albert's demonstration rooms in London by the Dracopie process. Made in the presence of the editor of this journal on November 17, 1909; and guaranteed free from any hand work, fine-etching, or local control of any kind.



Extreme softness, from the same negative as the other examples, result of using the lamp without ex-centre motion.



Extremely hard result, high-lights gone: from same negative as other examples.

Series of blocks made from one full-tone negative, to show adaptability of the new "Albert" process. (See also pp. 4 and 5.)

Estab. Jan. 1894.
"The Process
Photogram."

THE PROCESS
ENGRAVER'S
MONTHLY

THE PROCESS PHOTOGRAM
ESTABLISHED JAN 1894

Vol. XVII. No. 193.
JANUARY 1910.

Edited and founded by H. SNOWDEN WARD, F.R.P.S., Founder of *The Photographic Monthly*.

The New Process of Dr. Albert.

In spite of the amount of space given to this process in our recent issues, including almost complete quotation of the patents principally affecting it, we fear that our readers can have gained but a poor idea of wherein its advantages consist. Few processes that seem so involved in the patents are so convincing in the actual demonstration, and we recommend every half-tone reader who can do so, to see the process in work. This can be done in London at the studios of the agents, C. Janzer & Co.; and Dr. Albert will be demonstrating in the United States within a few weeks (or possibly a few days) of the appearance of this issue. Following these notes we give statements of the commercial and of the technical advantages claimed for the process by Dr. Albert himself, and supplied by him, through his agents.

THE ESSENCE OF THE NOVELTY of this process lies in the fact that no screen-negative is made or used at any stage. Instead a good full-tone (ordinary photographic) negative is used for printing. In the printing-frame one places, *firstly*, the half-tone screen of any desired coarseness; *secondly*, the full-tone negative with its glass side toward the screen; *thirdly*, the sensitised metal plate, with its sensitised surface in contact with the film of the negative.

The printing is done by means of an electric arc lamp, which is driven by an arrangement of machinery in a course adjustable in two directions (both parallel to the surface of the screen and negative) by means of two "ex-centres."

THE FORMATION OF THE DOT follows on lines well developed during the past twelve years or so, and amply discussed in our pages. It is all reasoned out in the same way as it has been in connection with the older methods. The principles are the same, with these alterations:—

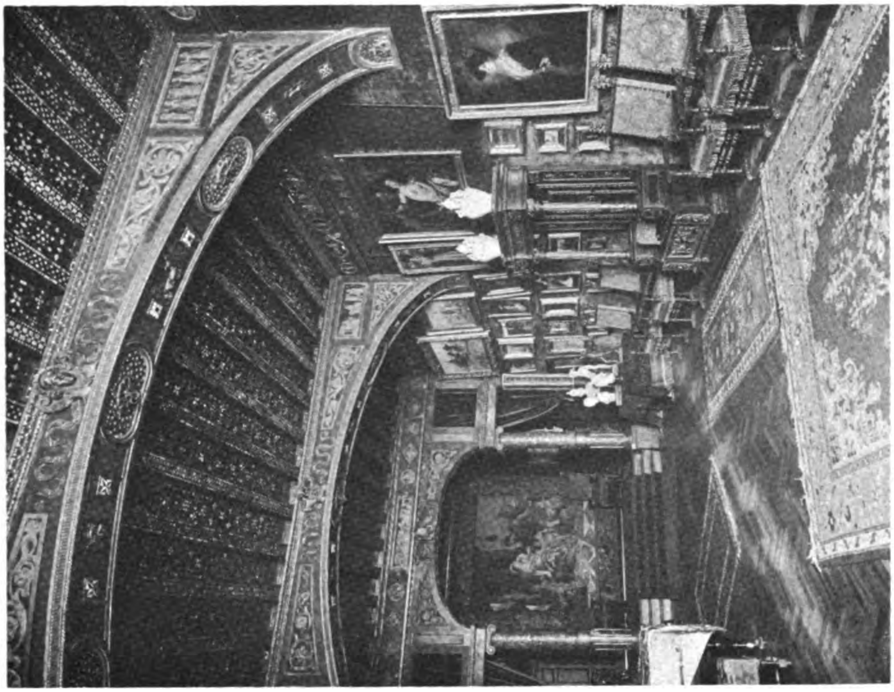
(*a*) A sensitised metal plate replaces the dry plate or wet plate.

(*b*) The printing lamp replaces the lens aperture.

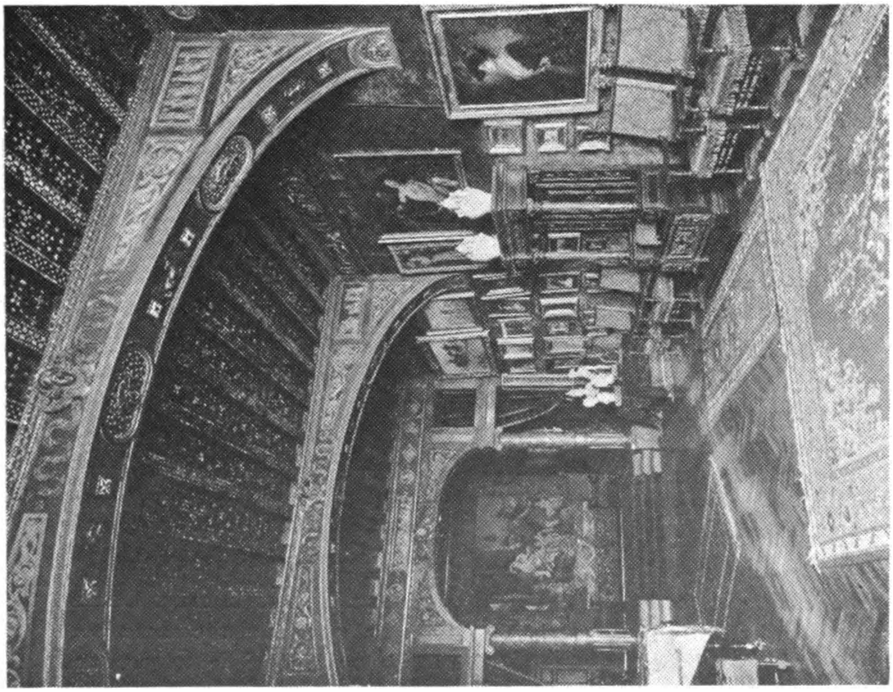
(*c*) A full-tone (ordinary photographic) negative replaces the visual image formed by the lens.

The shape of the dot, the steepness of gradation ("hard" or "soft" blocks) and the amount of detail can all be regulated by the driving of the printing-light, and by its distance from the printing frame, which are varied in accordance with the coarseness of the screen and the thickness of glass (screen and negative) between the ruled lines and the metal plate.

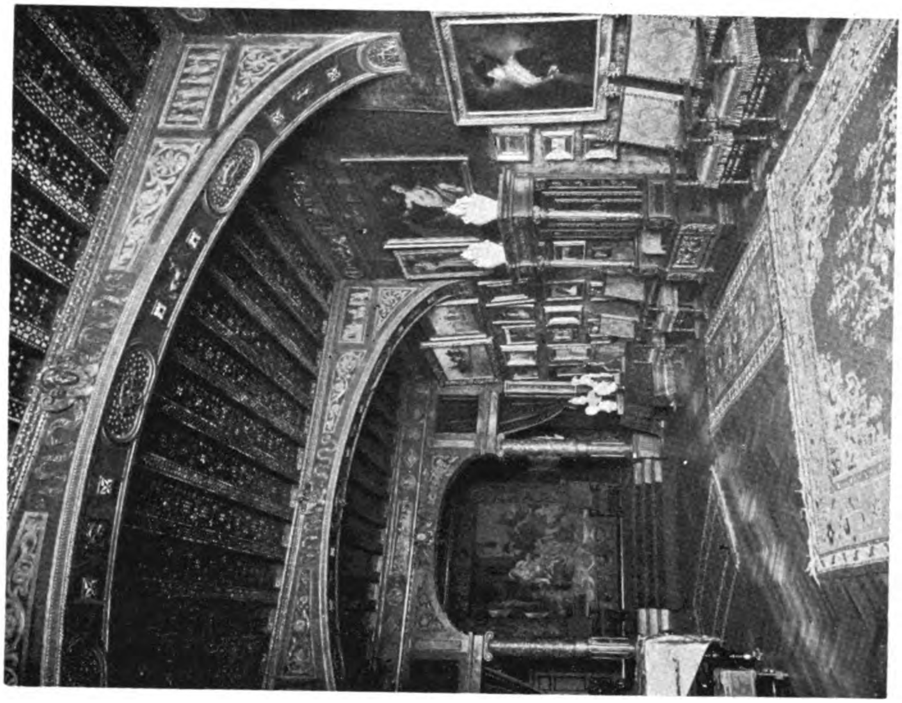
ONE NEGATIVE, MANY COARSENESSES. From one and the same negatives it is not only possible to produce various



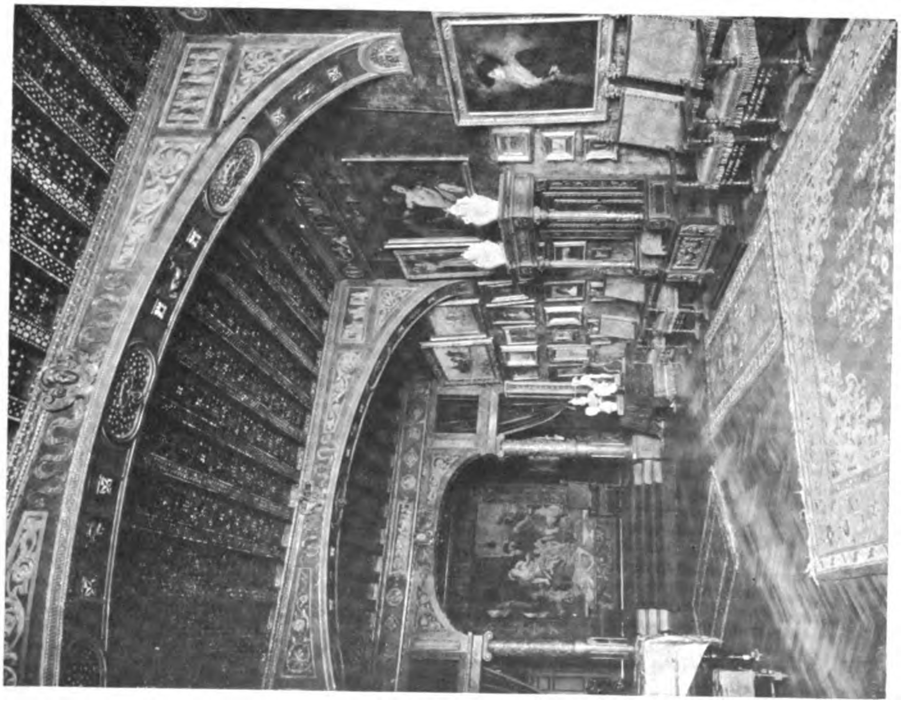
120-line block, made from the same negative as the other examples.



80-line screen block, made from the same negative as the other examples.



Block made from the same negative as the other examples, showing deep shadows and strong contrasts. Compare with proofs on p. 2.



175-line block, made from the same negative as the other examples.

qualities of plates (hard or soft, etc.), but also as many different coarsenesses as there are screens available.

VERY GREAT CLAIMS

are made for the process by the inventor. They seem to be fully substantiated, and there is reason to believe that this process must quickly take the place of the methods which have done such good service hitherto.

INCIDENTAL ADVANTAGES

are many. For instance, there is no heating beyond a temperature comfortably borne by the hand, hence zinc can be used without becoming de-natured. Sensitised metal plates may be kept in stock in a suitable cupboard, hence blocks can be very quickly made for newspaper work, or wherever speed is an advantage. If wanted same size as original, they can be made from the press photographer's negative direct, without the need to make any print. In color-work, and in orthochromatic copying, too, the advantage of being able to make a block direct from a negative on any kind of plate and suitable for use with any method of light-filtering means a great deal.

ADVANTAGES OF THE DR. ALBERT PROCESS.

Statement of claims, technical and commercial, by Dr. Albert:—

1. Absolute saving of making diapositives when taking photograms in galleries.

2. If reproductions of the same size in different screens are required, second or repeated photography is saved.

3. As no diaphragms are used there results an economy in photography of about 50 per cent. in time, 50 per cent. in wages, 50 per cent. in material, and 75 per cent. in electric current, quite apart from the saving of chemicals, as full-tone negatives can be made so much surer and more simple than screen-negatives, and as they are made in half the time there is the double capacity at the same expense. This is mainly the case with middle sizes, whilst if there is a question of larger sizes the saving is considerably more.

4. *Quality.* — No comparison can be made between the results obtained by this process and those obtained from screen-negatives, as—

(*a*) Full-tone negatives contain more details and tone-values.

(*b*) The negative is placed directly behind the screen with the film on the sensitised plate, and the motions of the lamp which replace the diaphragms in photography are mathematically so calculated that all tone-values are reproduced with great sharpness, whilst all such tone-values and sharpness are now lost in photography in the making of screen-negatives; and later on, even with the greatest expenditure of time and labor, it is impossible to get them back on the plates.

As a consequence, for black and white plates, provided the negatives and copies are good, 80 per cent. of the plates after etching in the Dr. Albert etching machine are finished and retouching of same economised. In the making of color-plates there is no doubt that if the above conditions are fulfilled there is an economy of 50 per cent. in retouching and labor expenses.

(*c*) Further advantages are: copper quality on zinc, resulting in an economy of 60 per cent. in metal.

(*d*) Economy in space: after careful calculation only about 250 square feet are necessary for a turnover of 1,000,000 square inches per annum for the space of printing and etching.

(*e*) This process can also be used on copper.

These statements are made in good faith but without obligo.

Main Points.

Screen-negatives.—It is easy to prove theoretically that a screen-negative does not give the tones of the original in form of points and lines in proportional dimensions; in practice one therefore tries to obtain a right size of points and lines by chemically reducing the covered points in the shadows, and by strengthening the lines respectively by decreasing the transparent points in the lights.

These manipulations take a great deal of time, and the better or worse result is entirely dependent on the ability of the workman.

What diaphragms are to be used in making screen-negatives depends on the character of the original and the exposure required.

The sizes of the points in screen-negatives are again influenced by the diaphragms, the distance of the screen from the sensitised film, and by the time of exposure.

Such a quantity of moments make a quantity of faults possible, and render the making of screen-negatives one of the most difficult tasks in photo-engraving, contrary to that in the Dr. Albert process.

Photography.—A tone negative may be made in the fifth part of exposure of a screen-negative, as the light rays are not retained by a screen. Errors with diaphragms are impossible, as no notice need be given to the formation of the dots; and as also all the work connected with reducing and strengthening is unnecessary, the double quantity of tone negatives can be made than of screen-negatives, which reduces the expenses in photography by half and the costs of light to one quarter. From such a tone-negative in the usual time for copying on copper, brass, or zinc, a copy can be made which contains all the tone values of the negative in the correct size of the dots.

All the sources of faults which exist in making screen-negatives exist no longer. There are neither different originals nor reductions, the original being always a negative, and instead of different reductions it is always the same size.

The ex-centres on the lamp are an analogon for the diaphragms, mainly depending on the thickness of the glass of the negative and the coarseness of the screen, for which a simple scale exists and at which a difference of up to half a millimetre of the glass is of no importance. The ex-centres are never changed during a copy. The arc-lamp itself has been acknowledged for years to be absolutely economical and equal burning. The formation of the dots by this lamp does not take place arbitrarily but under mathematical constraint, and as the film side is in contact with the sensitised coating, an absolute sharpness is obtained, and rich details and drawings, which cannot be obtained from a screen-negative, are the consequence. Even by manual work such sharpness could not be obtained.

Besides the economies in photography, still greater savings are laying in the Draco varnish of the plates, which are mainly remarkable in the making of three- and four-color plates.

If zinc is used as metal the Draco-copying process guarantees the same quality and gives also all other advantages—no rolling-up in retouching, as copper plates, and excels the latter by the cheaper and easier working of them.

The economy obtained by zinc *versus* copper is about 60 per cent.

Photograms and Drawings for the Press.

A lecture given at Bolt Court School. By Mr. A. Johnson, Art Editor of *The Tatler*.

Mr. Johnson roughly divided all papers into two classes: 1, the better illustrated weekly and monthly magazines, which are printed on the highest grade paper, upon flat-bed machines; 2, the daily paper, with the very large number of cheaper weeklies printed by rotary machines on a wood or straw pulp paper.

A photogram suitable in every way for reproduction in *Country Life* or *The Sphere* would be almost useless for *The Daily Mirror* or *Lloyd's*. On the other hand, the hard black and white photogram demanded by the daily newspaper for reproduction would in few ways be suited to the *Strand Magazine* or the *Connoisseur*.

In choosing protograms for press reproduction considerable thought must be exercised by an art editor, who knows whether a coarse, medium or fine grain block is required by his printers. Good originals suffer at times in inexperienced editorial hands. A print full of clean detail is marked for reduction to such an extent that the engraver can never produce a satisfactory block. Originals suffer in the same way only in a different ratio, when over-enlargement is demanded. A microscopic original, however sharp and clear it may be in detail, when enlarged beyond reason produces a block that is "woolly" and flat.

IMPROVING BAD ORIGINALS.

The editor who knows his work thoroughly can judiciously reduce a flat and colorless original, so that the engraver has every chance to make a passably good block. Carefully judged reduction will pull together a flat picture, emphasising every tiny shadow and thus apparently heightening the high-lights. On the other hand, a small original full of dark shadows may be transformed into a passably good picture by enlargement and the valuable help of the engraver in breaking up black masses by careful etching.

Unfortunately the art editor who deals with current pictorial events cannot choose his originals as he would desire, and for this reason demands are made upon the engraver and the retouchers, clever men whose business is to put into a print much that has been left out by the photographer.

TREATMENT OF ORIGINALS.

Often a photogram of an occurrence of great importance is bought by a number of widely different papers, hence the high-class weekly must touch up and utilise the original—which is commonplace from an artistic point of view—until it attains a degree of perfection and fulness of detail parallel with the high grade of printing employed. The daily paper, owing to press of time, the comparatively rough paper and rapid printing, will seek to remove everything except the central object. Backgrounds will be painted flat grey or wholly cut out of the block. The high-class paper seeks to enlarge and intensify all the minor details.

"NEWSY" SUBJECTS.

The art editor of the high-class paper seeks a picture full of important detail that he can well reproduce in his journal. Those who buy for the daily papers prefer an original with the central figure bold and nothing else. Owing to the extended uses to which illustrations are now put, the art editor's choice of suitable originals is becoming less and less. Unfortunately he is bound to accept prints which are far from good so far as technique is concerned, but which are excellent from a news point of view. He is often comcompelled to accept inferior prints, knowing that nothing better of the particular subject is available. In this I am speaking largely from my own point of view—that of the worker on a weekly illustrated paper dealing with topical subjects. Editors who do not deal with topical subjects are also being compelled to hasten the selection of their originals, a method which prevents a wide choice being made. The time allowed the engraver for his work becomes less every day.

Work that was a question of days a few years ago is now a matter of hours—nay, even minutes. This pressure still further detracts from the picture. Photographers and artists have minimised these deficiencies, and to some extent the reading public are satisfied with pictorial impressions in place of the full representation of a scene so long as the subject of the picture is fresh and attractive.

ORIGINALS, TO CHOOSE.

Illustrations for papers printed on rough paper should be full of vigorous color, with brilliant high-lights and with all the essential parts of the picture showing a degree of clearness that is known in focussing as "pin sharp." The gaslight or bromide print—not too glossy—which is now so universally used by all press photographers, will give the best result, while a well-printed clean silver print leaves nothing to be desired. The original that is grey all over, which is without color and definition, will never make a good block.

Reject the print that has a surface glass-like in its glossiness. Refuse the matt surface print, beautifully soft and artistic to look at, but an original that is unsuitable in many ways. There is nothing in such an original that the lens can "grip." The over-soft half-tones and shadows and subdued high-lights so attractive in the original picture come flat and dull in the finished block.

For a paper printed on flat-bed machines on the high-class enamelled paper commonly known as art paper more latitude may be allowed in selecting a picture with delicate detail, modelling, and color. The very fine grain block used will enable the engraver more faithfully to reproduce the full beauty of such an original, although much discrimination is necessary to decide finally when too carefully graduated shadows make the reproduction too flat and dull. For reproduction on good paper avoid the "soot and whitewash" original.

Wash drawings should not contain too large a proportion of body color—unless this has been painted by a practised hand. Rather choose the drawing that is made up of pure wash with the high-lights indicated by the white of the card itself. More than one clever artist with the brush employs chinese white or its equivalent with the greatest success to indicate high-lights, but only the master hand can use such a medium. A drawing full of dense shadows in close contact with delicate outline or too near the intricate lights and shades of a piece of fabric, a wisp of hair, the profile of a face, is not an ideal subject for reproduction. Few artists in wash can vignette their work satisfactorily, and in selecting such a drawing keep a sharp look-out for backgrounds carelessly graduated, or those that have a lumpy and uneven look. The ideal vignetted shadow is so applied to the drawing that at its darkest point it is almost a solid black or a very full tone, which almost imperceptibly vanishes to an edge that is hardly discernible on the original.

LINE DRAWINGS.

In selecting, bear in mind their probable reduction. The practised artist keeps his shading open and his drawing practically free from solid blacks, relying on reduction to give good vigorous color. Never choose a line original smaller than the intended reproduction. A third or half reduction is usually best. Avoid the drawing full of minute cross hatching; and above all, discard that which is full of alterations made with indifferent chinese white and over which the artist has tried to cover his faults with clumsy, splotchy lines of shading or meaningless background. There should be no erasures in a line drawing. Ragged, irregular lines never reproduce satisfactorily except with a maximum of trouble. Avoid the line drawing that is full of amendments made on odd pieces of card and pasted over inaccuracies until the drawing looks like a jig-saw puzzle. The ideal line drawing should be so full of vigorous lines and carefully adjusted high-lights that it will safely bear a range of reduction from a half to even more than one-twentieth.

NEW CLASSES OF ORIGINALS.

New styles of originals are daily becoming more common. Drawings in pencil, crayon, and crayon and wash, are offered for half-tone, and in crayon or charcoal on rough card for line reproduction. Happily for the editor and engraver, the men using these rather difficult media are mostly practised artists, and know how to obtain the best results. Generally the combination of crayon and wash should be completed in a bold vigorous way, with a minimum of lines. The inexperienced artist betrays his lack of artistic knowledge by meaningless lines, by heavy patches of crayon color, and by over-use of wash to emphasise his modelling. The artist who works in crayon for line reproduction often uses the pen to give definition to the pupils of the eye, or a profile, and to accentuate minute high-lights surrounded by shadow.

COLOR-VALUE OF ORIGINALS.

Always choose an original over strong in color, for nearly every original loses color value in reproduction. Therefore carefully note that the drawing or photo selected has its full proportion of well-defined shadows and clear bright high-lights.

Another Stone Substitute for Litho-stone.

HANS CHRISTENSON of Halle-a-S. patents a method of preparing a lithographing surface of artificial stone, as follows:—

"This invention consists in applying to a backing a coating formed from sodium aluminate or its constituents in water saturated with carbonic acid. A smoked or grained plate formed from stone, sheet zinc, or other metal is heated to a temperature of 90° C. A suitable liquid is then applied, preferably by means of an atomiser, which liquid is formed by adding sodium aluminate or a mixture of sodium and aluminium hydrate to water saturated with carbonic acid. The liquid applied to the heated plate is allowed to evaporate and the plate is washed in water. This process of applying, drying, and washing is repeated several times until the coating formed is of sufficient thickness. This coating forms the printing surface."

Improvements in the Harris Offset Press.

Alfred F. Harris, Trumbull, Ohio, communicating through the Anglo - American Inventions Syndicate, Ltd., London, E.C., claims patent as follows:—"As is well known in the art of printing, streaks or blurs will occur whenever the printing members do not have a uniform face speed. In 'offset' presses of the rotary type, this difficulty has been accentuated by the number of cylinders employed, and while it might readily be overcome as between two cylinders it frequently remains in respect to one of them and the third cylinder, since it will arise whenever there is improper packing of either the plate cylinder or the transfer cylinder, variations as small as one-thousandth of an inch being sufficient to cause streaks.

"The objects of the present invention are to furnish simple and highly efficient means for overcoming these difficulties, and to provide mechanism for carrying out the invention in connection with offset presses now in use.

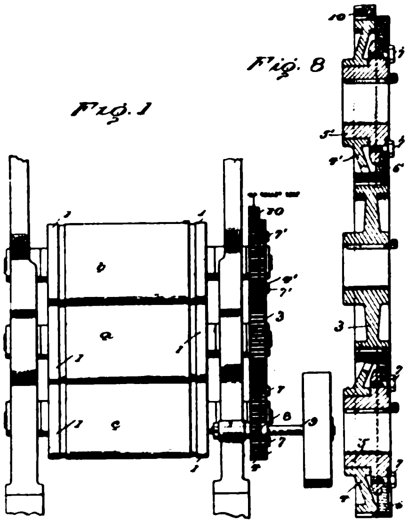
"The main object of the invention is effected by having one cylinder drive another throughout a portion of each revolution, independently of their intermeshing gears which effect the drive normally; the co-operation being discontinued for sufficient time to enable the driven cylinder to drop back, and the gears to get into register again.

"The second object of the invention is effected by providing the transfer cylinder with a fixed gear and the impression and plate cylinders with fixed and idler gears, the idler gear being utilised for receiving or transmitting power.

"Of the several cylinders geared together, each is affixed to its respective shaft. The driving power for the plate and impression cylinders is derived from the transfer cylinder, and as the bearers of the latter engage the bearers of either of the other cylinders, such cylinder, together with its shaft and gear, is thereafter, while such engagement continues, caused to move at a uniform speed with the transfer cylinder irrespective of the mesh of their gears, but when the breaks or interruptions in the continuity or regularity of the bearers of the transfer cylinder reach the bearers of the other cylinder the latter will fall back to permit its gear to again get into register with the gear of the transfer cylinder. Hence the cylinder of lesser diameter is driven during a portion of its revolution, wholly by direct engagement with the cylinder of greater diameter, and the gears are again brought into register during the remainder of such revolution.

"While it is not desired to restrict the invention to any exact difference in the respective diameters of the several cylinders, it may be stated here that in certain styles of offset presses it has been found that the stated results are obtained if the diameter of the transfer cylinder, through its bearers, exceeds the diameters of the plate cylinder and the impression cylinder, through their bearers, by but a few thousandths of an inch, the diameters of the two latter cylinders being equal. The breaks or interruptions in the bearers may be formed either by omitting segments thereof or by reducing the thicknesses of the bearers for a short distance, sufficient to allow of a relative retrograde movement between intermeshing gears, so that the gear of the smaller cylinder may fall back into register with the gear of the larger cylinder.

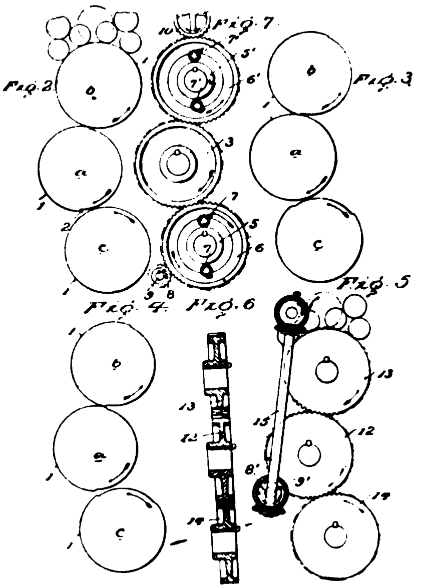
" Referring to the accompanying drawings, fig. 1 is a rear elevation showing the improvements applied to a rotary planographic press. Fig. 2 is a diagrammatic view showing the break or interruption in the bearers of the transfer cylinder. Fig. 3 shows breaks in the bearers of the plate cylinder and impression cylinder. Fig. 4 shows breaks in the bearers of all three cylinders. Fig. 5 shows the driving power applied to the transfer cylinder. Fig. 6 is a sectional view of the gearing of fig. 5. Fig. 7 is a face view, and fig. 8 an enlarged vertical sectional view of the gearing of fig. 1.



" In a press of the type shown, by making the transfer cylinder *a* of an almost inappreciably greater diameter than the plate cylinder *b* and the impression cylinder *c*, and driving both of the latter cylinders by the transfer cylinder, streaking will be entirely obviated. Around each of the cylinders there is placed fixed bearers 1 which become part of the cylinders. These are shown in fig. 2, the bearers of the transfer cylinder having breaks or interruptions 2, but if desired the bearers of the transfer cylinder may be continuous, and those of the plate cylinder and impression cylinder formed with interruptions (see fig. 3), or there may be interruptions in the bearers of each cylinder (see fig. 4). The relative diameters referred to are through the several bearers.

"The working portions of the transfer cylinder and plate cylinder are built up by packing to bring their diameters at those portions into correspondence with the diameters through their respective bearers.

" In three - cylinder or planographic presses the diameter of the working portion of the impression cylinder equals the diameter through the bearers without the use of packing.



" In the drawings the transfer cylinder is shown as having a fixed gear 3 which gears with an idler 4 loose on hub 5 of the toothed ring of a sectional gear 6, which hub is keyed to the shaft of the impression cylinder. The driving pinion

8 on the operating shaft 9 meshes with the idler gear 4, which in turn drives gear 3 of the transfer cylinder, and the latter in turn drives the impression cylinder through gear 6. The toothed portion of gear 6 is detachably secured to its hub by a series of screws 7, and by loosening these screws the impression cylinder may be readily adjusted by hand to secure its proper positioning relatively to the transfer cylinder. This same form of gearing is employed on the plate cylinder, the idler 4′ being utilised to drive the inking mechanism through gear 10, while the plate cylinder itself is driven by gear 3, which is in mesh with sectional gear 6′, the hub 5′ of which is keyed to the plate cylinder shaft.

"This arrangement of gearing has been found advantageous for certain forms of offset presses now in use, but the invention is not confined to the employment of gearing constructed as here outlined. If desired, the inking mechanism may be separately operated, that is, by means independent of the cylinder gearing, and in that event the gears of all three cylinders may be fixed directly thereto, and the same results obtained in respect to the avoidance of streaks by applying the driving power direct to the transfer cylinder. Thus, in fig. 5, pinion 8′ of the driving shaft 9′ is shown in direct mesh with gear 12 of the transfer cylinder, which latter is in mesh with the fixed gear 13 of the plate cylinder and the fixed gear 14 of the impression cylinder. In this arrangement the inking mechanism is driven by a separate shaft 15 actuated by the driving shaft 9′."

Improved Color-collotype.

CHARLES THOMAS GARDNER, of Bristol, and James Taylor Harris, of Weston-super-Mare, have just patented a process by which reproductions of pictures in colors may be effected more satisfactorily, quickly, and economically than hitherto.

They "produce one or more negatives of the picture, on semi-transparent material, and equal in number to the colors employed in the reproduction. Each negative is then treated locally to render it of different degrees of density as required for the reproduction of the correct color shades, and from each of the negatives so produced a collotype plate is made. The collotype plates are then coated with color in the usual way and are used for preparing prints, printing in the proper sequence to obtain the correct color reproduction.

"A suitable method of carrying out our invention is as follows: First prepare a collotype plate from an original negative, and obtain from this the key negatives or impressions upon paper, such, for example, as the well-known baryta paper, the said negatives or impressions being printed in a light transparent blue color. The object of the light blue printing is to give a representation of the original picture, which, whilst it does not enter into the composition of the final negative, yet forms a key or plan by means of which the artist can ascertain the positions in which to locate his colors. Each of these paper negatives or impressions is then treated in order to obtain a surface of a transparency which is graduated according to the varying shades of color required in the resulting reproduction. As the paper is semi - transparent, a certain quantity of light can normally penetrate it, thus producing an even tint over the whole of the surface of a sheet of sensitised paper or a collotype plate placed in contact with it. Those portions which it is desired to render opaque to light are coated with such an opaque material as water color, or a stain not capable of mixing with oil or varnish. On the other hand, those portions which it is desired shall permit the passage of a larger quantity of light than would normally pass through the negative, are treated with a material such as oil or varnish, or a mixture of resin and turpentine or Canada balsam. Where a still stronger degree of transparency is desired, the varnish may be applied on both sides of the paper, and in some cases the paper may be rubbed or scraped to reduce its thickness at individual parts, thereby still further enhancing the degree to which light can penetrate at those parts.

"The process possesses a number of advantages in practice. For example, it obtains with one working a complete range of color shades, say, for example, tints ranging from the darkest red to the lighest pink by the judicious selection of the various colors. Moreover, it permits of the rapid production of color reproductions of pictures and the like, at a low cost, and with a result which is equal, if not superior, to that of the processes at present in vogue."

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"Process" in the Early Days.

Reminiscences by Mr. E. C. Middleton, at the Bolt Court School.

MR. MIDDLETON said that he began process work thirty-seven years ago, when they had not only to devise their own processes, but also their own materials all the way through. His personal experiences dated back to the year 1871, when photographing on wood for engravers engaged his attention. His first experience was in connection with some Fiji postage stamps that were brought along to be engraved. They were the first that came to this country, and were 1d. blue and a 3d. green, and in the treatment usually adopted, viz. soaking in an acid solution and then rubbing on to the wood, the image disappeared. They found they could no longer do the work this way, and so were forced into using photography. Then came along a postage stamp of Spain bearing a portrait, and this gave trouble, as no man in the shop could draw a portrait properly on wood.

In 1874 Mr. Middleton visited London when Rheinlander, the first man to photograph on wood with success, was working his process with great secrecy, and Smith was putting prints on wood by another process, not so successfully. After his investigations in London, Mr. Middleton returned to Birmingham, and at once commenced to work on this process. He experimented with the carbon process and spent three months in working it out, afraid to mention to a soul what he was doing. He thoroughly mastered the carbon process, then bought a copy of the *Autotype Manual*, which told him in three hours all he had learnt in three months.

Engravers at this time wanted something as near as possible to the drawing they had been used to, and they had great trouble with the artists. The latter would have it that the engraver entirely spoilt their work. But the engraver was treated unfairly by the artist, who would draw on wood with pencil outline, shade in with Indian ink, deepen the color in his dark shadows with lead pencil, put patches of Chinese white to lighten his high-lights, so that he had a drawing in about five colors, and gave the engraver something he could not reproduce.

GRAPHOTYPE.

The first process he remembered was graphotype, which, briefly, consisted of just a thick block of whitening with a smooth surface, on which the drawing was made with one of the silicates that hardened the chalk. The chalk was then brushed away, leaving intact the part that had been drawn upon. Other processes came along and he was told that engraving on wood was going to be snuffed out. In spite of that he determined to continue it. For line subjects he used to print straight on to the wood very often. He was not only a wood engraver, but a copper-plate engraver too. He never feared line zinco in their Birmingham work. The only occasion on which it seemed to answer was for architectural drawings. One could not draw so steady or so fine a line by that method, as one could cut with a tool.

EARLY DAYS OF COLLOTYPE STRIPPING NEGATIVES.

Collotype was next referred to. Speaking of the early "secrets" of collotype work, the lecturer concluded there was so little in it that the workers of the process dare not let it be known how it was done for fear everybody would be doing it. He explained his first experiments in the process, and gave a strikingly interesting demonstration of his method of stripping a film and having a gelatine negative ready to print in fifteen minutes, or three in twenty minutes. He first coated a glass plate with a very thin solution of gum arabic—a 4 per cent. solution was quite thick enough—and while this was drying he described the process: "I do not use any dish. First take your penknife and nick through the film all the way round the edges—about one-sixteenth of an inch is sufficient. The object of that is to counteract the tendency to refuse to come away which arises by reason of the gelatine having run down the edges of the plate and holding on to the roughness of the sides when the plates were manufactured. By doing this you will be quite sure the film is free. Don't use an unlimited quantity of solution, as the water gets into the film and swells it. The solution usually consists of 150 parts methylated spirit, 6 of water, and 6 of glycerine. The latter quantities vary according to the quality of the spirit. In this case I have had to put half as much again glycerine and water, so that to 150 parts of methylated there are 9 of glycerine and 9 of water. It is unnecessary to use a levelling stand, because when you pour the solution on the plate you have got an idea as to whether it is level or not. I now add a little hydrofluoric acid. My advice is keep your film wet and never give way. Sometimes you get the thing into a mess, but if you stick to it it will come right. If your negative is cracked take another glass plate, dip it in water and put them together, and that will hold them together while you strip the film. The degree of looseness of the waste bits round the edges of the film are a good indication as to whether it is ready to be stripped. I now take the film from each of the four corners first to see that it is actually free from the glass before I strip it. Next take a piece of paper—avoid paper with red lines on it, as it has a tendency to make marks on the film—place it over the film and squeegee it down. Then peel it off and the film adheres to it. To reverse the film pour a little of the liquid on another piece of paper and put the paper bearing the film down on to it, squeegee, and then strip." The lecturer transferred the film to the prepared gummed plate, adding that after washing off the gum round the edges of the film and varnishing it, it was ready to print from.

Continuing his remarks on collotype, Mr. Middleton said he was much troubled in the early days of collotype with bits known as grease spots. His remedy for this was to use a piece of soap in water, and practically wash the gelatine with soap. Just as collotype was perfected, the half-tone process came along, and he was told it was going to kill collotype.

Ruling Machines and Half-tone Screen-making.

Mr. Middleton said he was the first to use a pedal to a ruling machine, which reduced the time of the operations to a half and in some cases to one-eighth. Describing his first essay at making a screen, he said he ruled a block three inches square, made six or eight impressions and stuck them side by side. The lines were all ruled one way, and he took from that a collodion negative. With that screen he made a half-tone block (a print from which was produced), and that was one of the earliest half-tone blocks made with a ruled screen. It was printed in albumen; bitumen he never used. In describing his search for a ground to rule on, Mr. Middleton said he ultimately found this in Brunswick brown at a glass etcher's, and found it adhered thoroughly to the glass and made a splendid resist. He first used a steel point, but being dissatisfied he tried a diamond point. He gave up that, however, and used a sapphire, which was not hard enough to scratch the glass, and was the most suitable one to use. Temperature made a good deal of difference. He found he could rule screens up to 100 lines to the inch, but could not get them any finer, as his resist would not stand it. He filled up the lines of the screen with albumen and vegetable black, finding the latter much better than bone black, coagulated the albumen with spirits, and then cleaned them up.

Credit to Max Levy.

Later on, when the Levy screens came out, he found them more perfect and finer than he could make, and so bought some. He considered great credit was due to Levy for the wonderful perfection he had arrived at. He only used a single screen at that time, and he believed at the present moment they could get better gradations with a single screen than with a cross-line one. With regard to irregular grain screens, he had no faith in them.

A Cheap Mirror.

Mr. Middleton described an easy method of obtaining a cheap mirror for reversals, recommending the purchase of a piece of plate looking-glass and the payment of sixpence for an extra coating of silver, and by this means he found at a total cost of ninepence he got a reversing mirror as good as one that cost many guineas. Concluding with some advice to the students, the lecturer emphasised the importance of remembering that there was a commercial side to their studies. They had the advantage of the experience of years of investigation and practice, and could follow on the track of progress much better than they could have done a few years ago. First let them make as good a job as they could, then they might go for speed and smartness.

Prices in the Building Trade, and Prices in the Process Trade.

Louis Flader, writing in *The Plate Maker's Criterion*, makes comparison between the methods of the building trade and those of his own photo-mechanical industry, in the matter of cost and selling price. He says:—

"Take the building trades, for example. Organised labor usually makes its demands about the first of May. No one can remember when such demands were in the form of a decrease in wages. On the contrary, an increase in wages is the customary demand, and during the last ten years it has been generally granted. Building contractors view this increase in a philosophical manner, and merely add the increase in labor and materials to their selling price. I had occasion to employ a steam-fitter some time ago, and he informed me, while submitting his estimate, that the figures contained therein applied only up to May 1. After that date labor would increase at the rate of ten cents per hour, with a corresponding increase in his price. Under the circumstances there is nothing for the consumer to do but accept the inevitable, and right here let me add, no one ever heard of a building project being abandoned because of the high price of materials or labor and the consequent cost of building.

"The foregoing proves that the public will pay a fair price for any article it wants, and a fair price is one covering the cost of manufacture and allowing a margin of profit to the manufacturer.

"When we scrutinise the engraving industry what do we see? Nothing to warm the cockles of our heart, to be sure. Very few—if any—have a definite idea of the cost of manufacture, due in a measure to the difficulties connected with procuring such statistics, and ALL selling their products upon a uniform basis—at least ostensibly so. Perhaps it would be more correct to say engravings are sold upon a uniform basis only, so far as the method of measurement is concerned, for aside from the fact that they are sold on a square inch basis, there is very little uniformity about it.

"There is such a splendid opportunity to accomplish material good, that it is a pity engravers do not recognise it and take action for their mutual benefit and profits. There is perhaps not another industry approaching ours in importance to the general business world, that is beset with so many harmful customs. All of them possible only, because each engraver is suspicious of every other one, and all are bound to go it alone. It is hardly necessary to enumerate the ills of our business; they are too well understood to warrant it. But what shall we do to better conditions?

"A number of men have agitated these questions for years. At times it seemed their efforts would be crowned with success, only to be followed by periods of gloom black enough to discourage these pioneers. There, in my opinion, is their one great fault. They allow themselves to lose heart, and give up trying. No one jumps into the breach and their efforts lie dormant. This is harped upon by those of a sceptical nature as evidence of the utter failure of their attempts to do good, and thus the matter rests.

"Yet none of their efforts are wasted, for the absolute need of protection will in time compel all to take action."

Blue-printing Frames: A Penrose Patent.

A. W. Penrose & Co., Ltd., and William Gamble have jointly patented improvements in frames in which the negatives, etc., are held for copying by a pneumatically actuated flexible sheet behind them.

"The object of the invention is to improve the distribution of the vacuum over the surface of the sheet, and to arrange the air exhaustion by means of a motor operated pump so that it will automatically stop when the required vacuum is reached.

"The patentees are aware that means for distributing the vacuum have been employed in the form of solid ridges, extending in several directions, and that separate inner frames have also been employed; also that in electrical apparatus it has been proposed to utilise an electric circuit-breaking device operated by the pointer mechanism of a pressure gauge to break the circuit of an electrically operated pump on reaching a predetermined pressure.

"The need for providing passages to the orifice of the exhausting outlet of the flexible sheet is because it was found that the flexible sheet in the vicinity of the outlet would adhere so closely to the supporting surface as to prevent the passage of air from further away. This invention overcomes this difficulty by forming a stiffened area around the orifice of the exhaust pipe in which passages are formed which always remain open. Combined with this element a separate inner frame is used of a light and deep section fitting into a corresponding rebate in the outer frame, from which it is entirely removable, and means for exhausting the space between the copying sheets and the

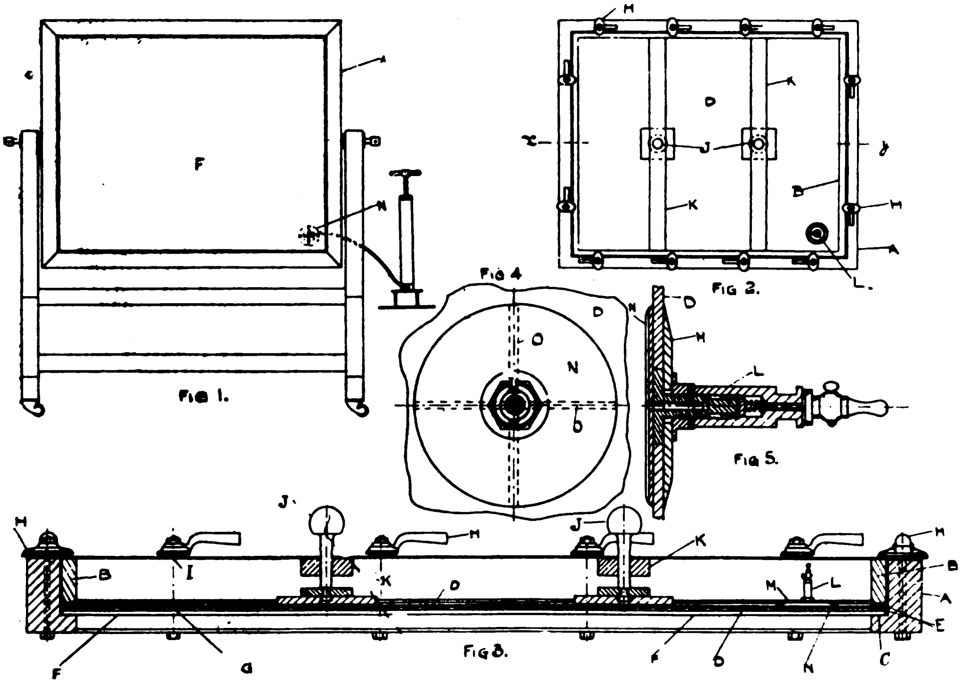


Fig 1. Fig 2. Fig 4. Fig 5. Fig 3.

flexible sheet, consisting of an electric motor operating a vacuum pump provided with a vacuum gauge, constructed so that when the exhaustion reaches a predetermined amount the pointer of the gauge makes contact with the terminal of a solenoid circuit, completing the said circuit, and thereby causing a magnet in the solenoid coil to move and break the main circuit of the motor; the motor is thus stopped and remains out of action as long as the gauge pointer remains in contact with the solenoid terminal.

"Fig. 1 shows a frame supported on pivots and operated by a hand pump; fig. 2 shows the back of the frame in plan; fig. 3 shows a section of the frame through the line *x—y* of fig. 2; fig. 4 is a plan, and fig. 5 is a section of the exhaust outlet; fig. 6 shows the connection of the pump and the electric motor, and the circuits for the automatic regulation of the latter, while fig. 7 shows details of the gauge and solenoid connections.

"A represents the outer frame formed with a ledge C. B is the separate inner frame which fits level with the surface of the outer frame behind when the rubber sheet D and the packing strips E E are in place. The glass sheet F rests on the ledge C, the negative and sensitive paper G on the sheet F, and the rubber sheet D on the back of the paper. The loose frame B is then pressed tightly on the joint strips E E by means of the rotating levers H, which act on a wedge-shaped face I on the loose frame, and thus render the boundaries of the rubber sheet D air-tight. The auxiliary screws J J in the cross-pieces K are merely to assist the putting of the various pieces in place when commencing.

"The outlet valve L is shown enlarged in figs. 4 and 5; it is of ordinary construc-

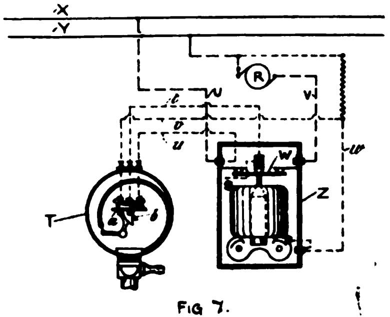
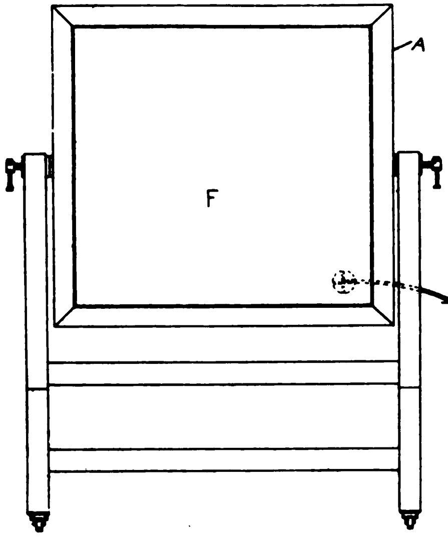


FIG 7.



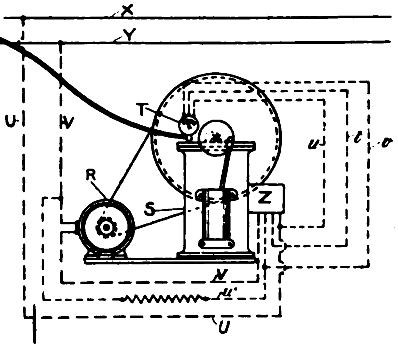


FIG 6

tion as regards its general features, but is connected to the rubber sheet by two layers of material M and N, of which the underneath one, N, has passages O radiating from the central opening of the valve. These layers M and N are stiffened and attached to the sheet D by vulcanising, and thus always preserve a passage for the air to the outlet.

"Referring now to figs. 6 and 7, the drawing shows the connection of the frame A with a pump S driven by an electric motor R and provided with a vacuum gauge T. X Y is the main electrical circuit, U V the motor circuit bridged in the solenoid box Z by the bridge piece W; *w* is a shunt circuit and *t*, *u*, *v* are fine wire circuits connecting the terminals in the gauge T, which is also provided with a rocking piece *a* operated by a pin *b* when the vacuum reaches a predetermined amount; and by tilting the rocking piece *a* changes from the circuit *u* to the circuit *v*, thus short-circuiting the solenoid through the shunt circuit *w*. The short-circuiting of the solenoid causes the dropping of the bridge piece W and the breaking of the motor circuit, which causes the stoppage of the motor and the stoppage of the pump."

An Improved Wall-paper Transfer Process.

The engraving of rollers and the printing of sanitary and other wall-papers from rollers or plates engraved by photo-mechanical means is a side-line that comes to the front occasionally in the "process" world. A recent patent, taken out in various countries, has no direct connection with the engraving of the printing surfaces, but as it claims to secure improved results and open further fields for their use, it has interest for our readers. The patent is taken by the Société Weiluc et Cie., of Paris, who claim that it relates to a composition for use in printing mural decorations or oil paintings by means of engraved plates upon prepared paper from which the paintings are transferred to the inner or outer walls of buildings, thus dispensing with the expensive and lengthy decorative hand painting.

They mix color of the required tints with linseed oil, fish glue, castor-oil, collodion, indiarubber solution, wax, oil varnish, vaseline, borate of manganese and silicate of soda, in about the following proportions, viz. :—

Color prepared to the required tint	20	parts.
Boiled linseed oil	10	,,
Ordinary linseed oil at a temperature of 60°	15	,,
Fish glue	5	,,
Boiled castor oil	15	,,
Collodion	2	,,
Indiarubber solution	5	,,
Melted wax	1	,,
Oil varnish	15	,,
Vaseline	4	,,
Borate of manganese	3	,,
Solution of silicate of soda	5	,,
	100	,,

They are aware that indiarubber solution, glue, varnish, linseed oil and wax have before been employed in the preparation of oil paint for the purpose described, and they make no claim to such materials except in combination with the other enumerated ingredients.

As our readers are well aware, the "Sanitary" wall-paper printing methods were the basis of the wonderfully successful machine-printed photogravure of Rembrandt intaglio fame. Not much has been published about the methods, the only reference-book on the subject being *Photo-Aquatint and Photogravure*, by Thos. Huson, R.I., R.E.

The Process Year Book.

This excellent, this indispensable, annual volume, must suffer in a review because it has already set so high a standard that the appreciative adjectives have all been exhausted. If it shows advance, this must be the advance of the craft, rather than improvement in the book *per se*, for it was already fully up to the craft's possibilities. In noting the differences, therefore, between the current volume and its forerunners we find, quite naturally, that they are the result of progress in our own and kindred trades.

Trichromy is "feeling its feet" and giving results which we no longer criticise as being "very good under the circumstances," but appreciate as fine productions, irrespective of circumstances. Printing on matt-faced paper has advanced very materially during the year, as the result of the combined efforts of paper-makers and printers, and the best results obtainable are in the current *Year Book*. Offset printing has made great strides and is dealt with in articles, in addition to having its results in fine color-work exemplified by an insert in five colors, printed on the two-color rotary offset press of Geo. Mann & Co., Ltd., of Leeds, for whom it is claimed with pardonable pride that theirs is not a copy of an American machine, but an entirely original design.

Many of the important technical questions of the day are discussed by authorities who have studied them at first hand, and the various interesting applications of illustration are exemplified by the work of many of the ablest photographers, designers, and reproducers.

Most of our readers know the *Year Book*, and need no urging to purchase the current volume. If any do not, we suggest that they make its acquaintance at once, and can guarantee that they will be delighted and benefited.

Penrose's Pictorial Annual: The Process Year Book, price 5s.; post free: inland, 5s. 6d.; abroad, 6s. 2d. London: Penrose & Co., Ltd.; or Dawbarn & Ward, Ltd.

- - - -

Acid-proof floors, covered with three layers of thick tarred felt, are used in the Barnes-Crosby works. Where one occupies rented premises, with wooden floors, such an arrangement is convenient and economical. The felt can be easily raised and removed at the end of a tenancy, and will leave the floors unworn.

Collotype and Photo-litho.

Letterpress versus Litho.—According to the makers of the "Harris" offset press, many letterpress printers have taken up lithography since the advent of this class of machine.

Progress of the Offset Press.—Though only a baby, the offset lithographic idea is growing wonderfully. There are a dozen different machines on the market now; the process is being used for some fine color-work, and a newspaper printing press has been completed on offset lines.

The word "metallography" has an old-established meaning as "the science that treats of metallic substances," and was afterwards adopted for a method of etching metal plates to print a wood-grain effect, by pressing upon them pieces of grained wood, soaked in acid. It is unfortunate that the same word should now be used for lithographic printing from metallic surfaces, and we are glad to see Mr. Charles Harrap's protest in his recent book. The difference he makes, however, by omitting one "l" and calling the process "metalography," seems hardly sufficient to avoid all error; and there is much to be said for using the fuller name "metalithography," if we need a portmanteau word.

Publications.

"The Williams-Lloyd Catalogue" of photo-engravers' machinery and supplies is a large, handsome, illustrated volume, full of particulars of carefully designed, well-built machinery and apparatus. In addition to typically American articles, we note the Penrose cameras, copy-boards, patent stops, etc.; Cooke lenses and prisms, the metzograph screen, Klein's light-filters, the Sinop collotype process, and other things hailing from "the old country." Of course there is a host of Williams-Lloyd specialties, including some very ingenious useful lines.

"Archivio Tipografico," now in its twenty-first year, asks us to inform our readers of the work that it is doing in keeping the Latin world abreast of the times in matters pertaining to print and illustration. Issued quarterly, in Italian, French, and Spanish, it is sent gratis to the principal printing firms in Italy, France, Belgium, Spain, Austria, Switzerland, Portugal, Greece, Turkey, and Spanish-America. It is the property of the Society Augusta, manufacturers of, and dealers in, everything pertaining to the printing business, and is edited from Corso Palermo 3, Turin; where the editor will be glad to hear from any of our readers who have matters of interest to his readers.

"Metalography," by Charles Harrap, is an entirely timely book of very great value, and published at an exceedingly low price (3s., postage extra) by Raithby, Lawrence & Co., Ltd., Leicester. The arrangement of the matter is workman-like and the treatment sufficiently thorough to give all the information necessary for the man who knows the principles of lithography already. The beginner, too, will find it a useful text-book to accompany the instructions of the teacher, or to explain the reasons for what he sees done in the shop. An interesting historical summary, with abstract of the patents and a good index, help to make this book a complete guide to lithographic printing from metals and by the offset method.

"Line Photo-engraving," by William Gamble, price 7s. 6d. (London: Percy Lund, Humphries & Co., 3 Amen Corner, E.C.).—This book is not only by far the most complete work ever devoted to its particular subject, but also probably the most complete and exhaustive treatise on any photo-mechanical method. The thirty-four chapters cover line-engraving from "History" to "Miscellaneous Processes and Formulæ," and the illustrations are very numerous and apt, from the highly-decorative tint-color picture in four printings (three colors and a black key) by the Half-tone Engraving Co., to the little diagrams of minor apparatus. Mr. Gamble has been wise in including processes that are of interest rather than of practical value, and in his preface he indicates those chapters which are necessary to the man who wishes to use up-to-date shop methods only. So far as we have been able to test it, the book seems full and accurate, though here and there are somewhat misleading expressions, as, for instance, the title of Chapter VI., "Photographic Copying Without a Camera." One might have thought that this dealt with such methods as Playertype, wherein a print is copied by contact with a sensitive plate; the light passing through the film to the subject to be copied. Instead, it deals with the making of traced or free-hand copies, through etching-grounds; point-etching on a semi-transparent ground with a negative (in a retouching-desk) as guide; pen drawing on ground-glass; drawings on translucent paper; enlarging and reducing with the rubber sheet; converting a line-drawing into a negative by varnishing and washing-out. Only the last paragraph is devoted to Playertype. On page 243 is a little printer's error, referring to fig. 129 when the reference is really to fig. 128, and the effect is momentarily puzzling, since fig. 129 is on page 243, just below the erroneous reference. These very minor matters will doubtless be corrected in the next edition, and if Mr. Gamble can supply exact particulars and quantities in a few of the older methods of which he gives interesting outlines, it will be appreciated by the experimenter. Meanwhile, the book has a host of good qualities and much most valuable matter. It is unique, and we commend it very heartily.

Specimens and so forth.

"The Christchurch Weekly Press" has a photo-mechanical department as progressive and up-to-date as possible, and the Christmas Number of the *Press* shows excellent samples of its work.

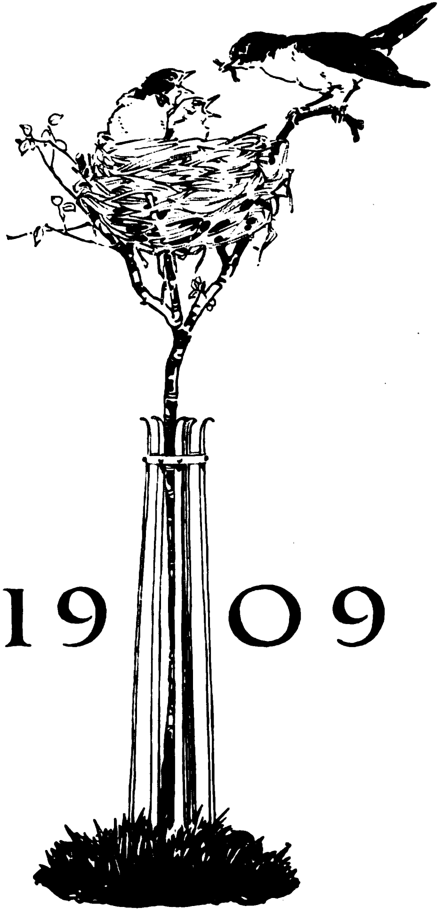
The most dignified advertisement that has appeared for a long time in connection with our business is "Some Illustrations of Process Printing, with a few practical remarks," issued co-operatively by Spalding & Hodge, Ltd., who made the paper; E. N. Frankenstein & Co., who were responsible for the inks; and Carl Hentschel, Ltd., who made the blocks and produced the booklet. The first article is a high appreciation of modern illustration methods, by Frederic T. Corkett; and there are useful notes on the printing of three-color blocks "from the engraver's point of view" and "from the printers' stand-point." The illustrations are very varied and interesting, admirably chosen to show modern reproduction in monochrome and in color, at its very best.

School Notes.

The Bolt Court Lectures for the month are:—January 13th, Reinhold Theile, Esq., "Some Unusual Photography"; 20th, Chas. Burdick, Esq. (of the Aerograph Co.), "The Aerograph in Process and Lithographic Work"; 27th, Edgar Clifton, Esq. (of Messrs. Dallmeyer, Ltd.), "How Lenses Differ."

The Leeds Technical Institute has just installed a photo-mechanical and printing department, under the superintendence of Mr. R. E. Barnett, B.Sc., the principal, and the direct management of Mr. S. E. Bottomley, who is known as the author of one of the very best text-books on photography, and who has long been the head of the photographic department of the Institute. As chief instructor, Mr. Guy Symmons, head of the process department of Alf. Cooke, Ltd., has been secured. For a long time Mr. Symmons was assistant with Mr. Howard Farmer at the Polytechnic, and since his removal to Leeds he has kept in touch with the craft through his lectures at Bolt Court and elsewhere, and his practical articles in the press. The new department has been fitted with "process" apparatus by Hunters, Ltd., and with printing plant by John Haddon & Co., Ltd. The number of students already on the books is very satisfactory indeed.

Bolt Court Students' Annual Supper.—The Students' Annual Supper took place on Monday, December 20th, at the L.C.C. School of Photoengraving and Lithography, and was a greater success than ever. The speeches were good, the songs were good, and the students' play, a tragical farce of most amusing intensity, was very well enacted. The number of distinguished guests this year was larger than usual. Sir George Frampton, R.A., again took the chair, supported by Mr. Pomeroy, R.A. There were also present Mr. William Strang, R.A.; Mr. Selwyn Image, Mr. Lenfesty, Mr. Claude Shepperson, Mr. Niels Lund, Mr. R. Anning Bell, Mr. A. S. Hartrick, Mr. Emery Walker, Mr. E. F. Strange; and among others we noticed Dr. Garnett, Mr. W. A. Casson, L.C.C., Mr. Wm. Gamble, Mr. J. Corey, Mr. T. R. Way, Mr. G. H. Palmer, Mr. Frank Colebrook, Mr. S. H. Wratten, and Mr. George E. Brown. As this was the last supper to be held in the old building, which will have to make way for the new school, before the proceedings terminated three hearty cheers were given for the old place in which the school had been housed for so long.



The illustration is part of the cover of the supper programme.

Trade Notes.

Manasquan, New Jersey, has now a process house — the Franklin Engraving Company,—capital $10,000 (£2,000).

The Strand Engraving Company's new premises are a very fine, large, substantial business block in Martlett's Court, Bow Street,

London, W.C., where they have ample space, a convenient position, and all the modern fittings, appliances, and methods that long experience can suggest and ample capital can provide. The firm has always specialised on the better class of illustration and catalogue work, and in its spacious new building should be in position to compete most successfully.

Brevities.

MORE WOOD ENGRAVING is being done in Birmingham to-day than ever before in the history of the craft: according to Mr. E. C. Middleton.

INTAGLIO HALF-TONES, specially treated so that the mesh or screen is scarcely discernible, are amongst the specialties of the Gatchel & Manning Company, of Philadelphia.

"DAY DREAMS," on the December calendar of the American Steel and Copper Plate Company, continues their series of American girls, in charming trichrome reproduction.

A CHEAPENING OF COST, such as seems promised by the introduction of Paynetype and the new Albert process, should be an opportunity for engravers to meet and determine that while cost may go down, selling-price shall remain firm. Customers who would resist an increase will remain quite passive under a maintenance of present rates. No doubt Mr. President Arthur Cox will look into the matter carefully.

OLD-TIME METHODS were well illustrated in Newcastle on December 6th, when Mr. Walter S. Corder lectured for the Literary and Philosophical Association on "The Making of Prints." He not only pulled proofs of various kinds of hand-engravings, but introduced Mr. G. B. Gibbs, of Sunderland, who engraved wood blocks, and Mr. J. Anderson, of Newcastle, who made a line-engraving on copper, in sight of the audience.

THREE-COLOR INKS began with claims to be perfect, or as perfect as possible, in all respects, and we are only learning slowly that it is impossible to secure all the desirable qualities in one single set. Shackell, Edwards & Co., Ltd., are doing a good thing when they show the results of using two different sets of their inks. The "Reliance" trio is said to be permanent, varnishable and gelatinable, while the "Ideal" set only claims to be "fairly fast, and suitable for most commercial work."

A NEW STEREOTYPE MATRIX, patented by Arthur Dutton, of Runcorn, Cheshire, is intended to avoid the stretching and shrinking that occur with matrices of papier mâché. He points out that asbestos has been proposed for this purpose, but that its toughness and fibrous nature have been obstacles to its use. It is now proposed to use a number of very thin sheets of asbestos fastened together by any suitable binder or cement (*e.g.* rye starch) and "filled" and coated with a heat-resisting material such as barium sulphate.

A NEW METHOD OF HALF-TONE PRINTING has been introduced by the Sparrell Print, of Boston, Mass., and is first shown in eight supplement prints in the Christmas Number of *American Photography*. The paper used has the appearance of a medium-surface drawing-paper, and the printing is very successful, considering the unpromising texture. It has somewhat the effect of a brilliant print seen through a Japanese tissue, and would not be suitable for subjects needing to show pluck and gradation, but answers sufficiently well for the photo-artistic studies for which it is used.

Estab. Jan. 1894.
"The Process
Photogram."

THE PROCESS ENGRAVER'S MONTHLY
THE PROCESS PHOTOGRAM ESTABLISHED JAN 1894

VOL. XVII. No. 194.
FEBRUARY 1910.

Edited and founded by H. SNOWDEN WARD, F.R.P.S., Founder of *The Photographic Monthly.*

Magazine Decoration: A Field for "Process" Expansion.

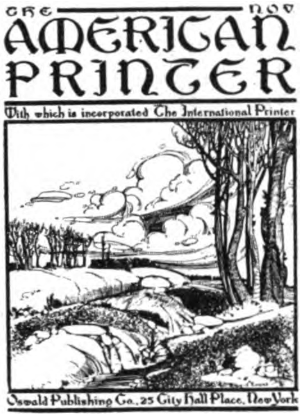
The Dec.
American Printer
With which is incorporated The International Printer
Oswald Publishing Co., 25 City Hall Place, New York

MAGAZINE covers, in Britain, do not bring so much grist to the "process" mill as they ought to do. Many of them are not changed regularly or frequently, and those which use new designs pretty often in many cases have a photographic original. The great selling-value of such beautifully designed covers as are used, say, for *The Ladies' Home Journal*, of Philadelphia, is scarcely understood in the old country. Such a set of designs as has been used during the past six months by *The American Printer*, from the pen of Albert Loose, of Dayton, Ohio, should be a good line for any commercial artist to offer to the magazine editors, and it should pay the engravers to create such designs and to encourage the growth of such work. The enormous reduction to which we have had to submit *The American Printer's* covers does very scant justice to the beauty and power of the designs, but the tiny illustrations are just enough to give a suggestion, while the half-tone of the cover of the 'Xmas Number, on page 27, will give a rather better idea of the effect of the cover, though it lacks the strength and delicacy given by the colors of the original. On a rather rough-faced paper, almost white, the text and outlines are printed in black, with a flat flesh-tint under the faces and exposed parts of the bodies of mother and child, and a light, yellowish-green tint on the mother's robe. Dull gold is used for the circle, for the "glory" against which the mother's face is profiled, for touches in the clouds, and three lines across the page, at head and foot.

Not only the decoration of the cover, but also that of the "features" of the contents—head-pieces and tail-pieces for the permanent sections—would probably appeal to the

The
American Printer
With which is incorporated The International Printer
Oswald Publishing Co., 25 City Hall Place, New York

Designs by Albert Loose.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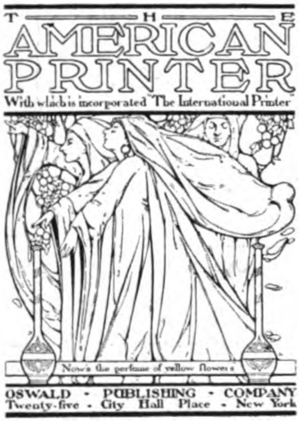
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With which is incorporated The International Printer
Now's the perfume of yellow flowers
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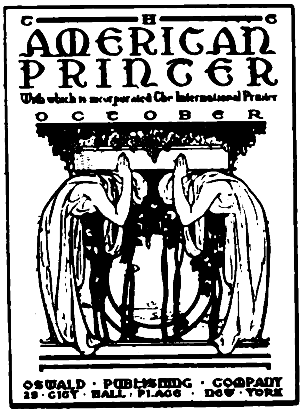
Twenty-five · City Hall Place · New York

art-editors of some of our wealthy, well-established magazines. An artist who can maintain a distinctiveness of style, while giving variety of design and brightness of invention, throughout the year, could do very much to enliven and beautify the pages of a periodical by giving it a new dress for each issue, complete and harmonious—cover, headings, and tailpieces, and possibly initial letters. The distinction so given to a magazine would surely be worth all that it cost.

It is perhaps worth mentioning, in this connection, that there are many signs of the increasing use of good line-work. In America, Germany, Italy, in the Norse lands and the Netherlands, and in our own Colonies of Australia and New Zealand, the changing habit is very apparent. In France and Britain it is less so, but even in these countries there are signs of a desire to vary the somewhat flat monotony of half-tones from photograms by the strength of color and delicacy of line that are only found in good pen-work. If the tendency grows, it will affect process men in two ways—adversely in so far as line-work means a smaller cash turnover than the same quantity of half-tone, but advantageously in so far as they may, and should, supply many of the originals, thus gaining in the artist department far more than they lose in the etching-room.

Associated with the reversion toward line-work and the growing appreciation of color, there are signs of an increasing use of flat-tint color-blocks, another field of work for the artists' room. Even where the original drawing is supplied by the customer's artist there is occasionally an opportunity to suggest the variety obtainable by the use of tints, either flat, or in the various grains that the transfer tints supply. All these openings are dependent upon the side of the business which produces, rather than upon that which *re*-produces, designs; a side which is much stronger in the American than in the European houses, and which is often much more profitable than the straight-forward block-making.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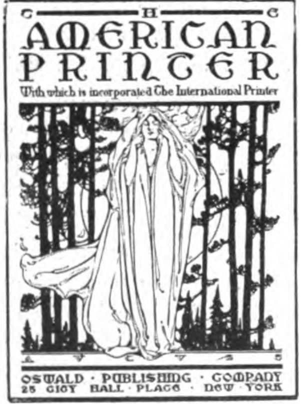
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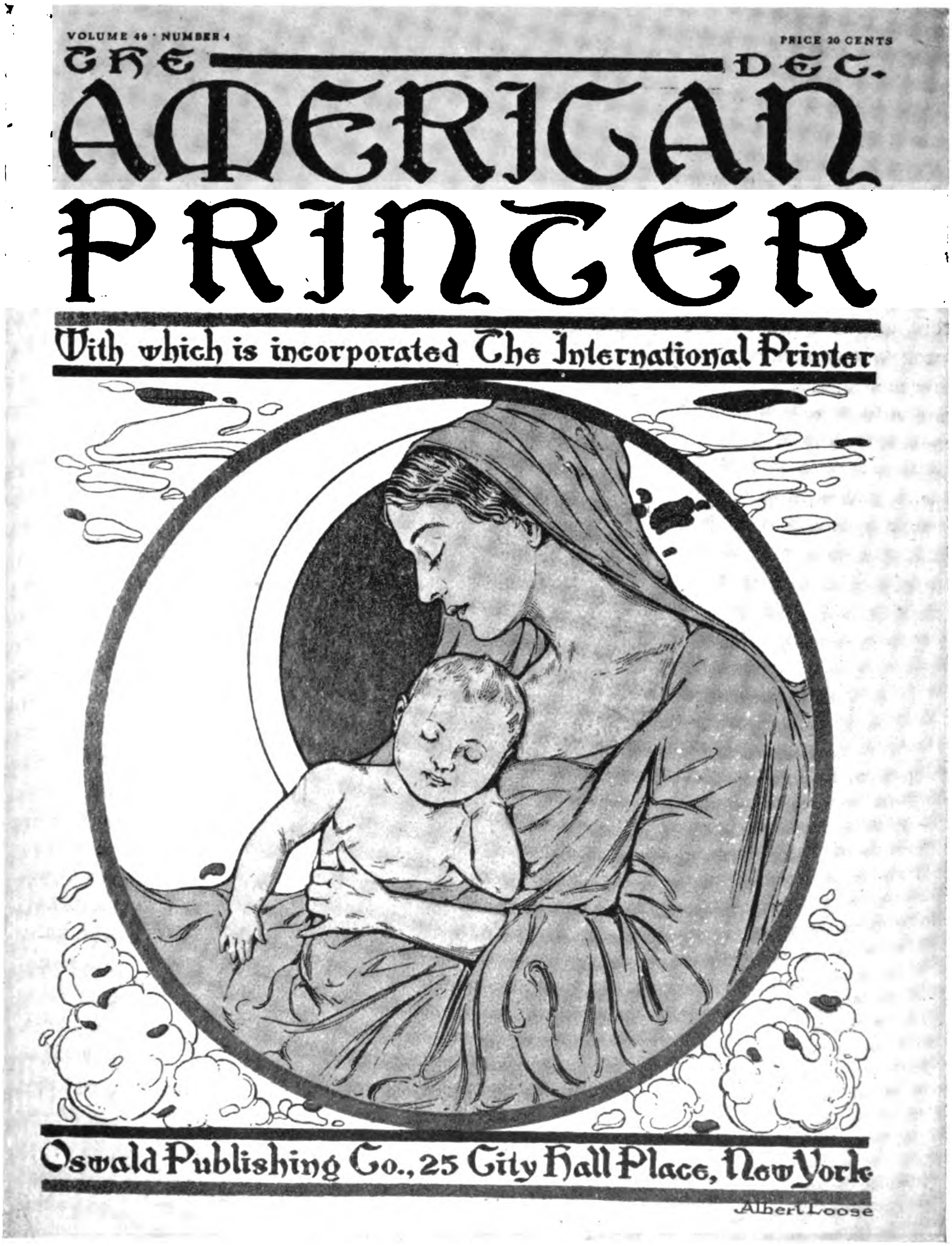
Designs by Albert Loose.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Albert Loose

COVER DESIGN BY ALBERT LOOSE, DAYTON, OHIO.

Original printed in black and two tints, with a little relief in dull gold.

*Icthyol in Photo-mechanical Processes.**

By F. Dogilbert; in "Le Procédé."

By diluting icthyol with its own weight of water we obtain an ink possessing the same character as lithographic crayon: that is to say, it gives to lithographic or metallographic surfaces the power of receiving thick ink after acidulation. It is interesting to have at least this product in reserve, if its use in daily practice is not advantageous. It is an interesting resource when requiring a solution of ordinary ink, so difficult to prepare if only a small quantity is desired.

Mixed with bichromatised gelatine, icthyol yields an exceedingly tenacious image, especially if the damping water has been slightly acidulated, though this is not indispensable. The proportion of 1 per cent. is amply sufficient.

In combination with bitumino-sulphurous resin it would be interesting to make a thoroughly practical study of it in view of its application to zincography. L. Vidal once proposed the use of tar in this connection, but what seems interesting to me is the ease with which icthyol forms an emulsion in water without stirring or causing globules or froth, always so troublesome.

Dissolved in a mixture of ether and alcohol, icthyol leaves after evaporation a granular resist identical with resin grain.

By modifying the proportions of the constituent parts we can vary the size of the grains, which allows the making of designs of varied and very interesting textures without resort to aquatinting. It is practically resin-grain in a bottle. The fixing of this grain is obtained simply by immersion in a bath of 2 per cent. or 3 per cent. of any acid whatever.

We can then make an alcoholic solution of tartaric acid and spread it over a design executed on transfer drawing-paper after having made our "reserves" as on zinc or stone, then pour the icthyol as with collodion.

---

* Icthyol is a coal-tar oil formed from dry distillation of a bituminous rock found in the Tyrol. The name is sometimes applied also to different derivatives of this oil (icthyol sulphonic acid and its salts) used in therapeutics. The oil and its derivatives have a very disagreeable odor and an intensely brownish-black color.

Screen-plate Originals for Color-work.

The ever-increasing use that is being made of autochrome and other screen-plate originals in natural colors gives a special interest to the recent paper at Bolt Court by Mr. W. A. Casson, L.C.C. The interest in these processes is increased materially by the claims made for the "Thames," the first all-British plate, which is used (or at option can be) with the color-filter separate from the sensitive plate, and therefore allows of the making of additional transparencies without the use of additional screen-plates. Another important claim is that as the color-spaces absolutely cover the surface of the plate, and there are no black fillings, the brilliance of the resulting transparencies and the purity of the lighter tints is very great.

Mr. Casson said that it was a commonplace statement not many years ago that "you may take screen photographs as you like, but you will never be able to reproduce Nature as we see it." To-day that statement is not true. We can reproduce Nature as we see it; in various ways and on various plates.

The origin of modern three-color work was the discovery that our color sensations are for all practical purposes limited to three. All the colors of Nature could be reduced down to these three sensations; so that it was only necessary to get any suitable combination of the three sensations to obtain any color we wanted.

The first step in color-plate making was to have three separate plates, and to take each through a different colored light-filter, in front of or behind the lens, through which the light passed to the sensitive plate.

That is the method to-day in reproducing all those three-color pictures of which we see so many in the magazines and elsewhere. Until quite recently it was the only method of reproducing a colored picture by photography. Then came a great advance. Messrs. Lumière, very eminent chemists and scientific men, devoted their attention to producing a plate which combined the three separate systems in one plate. Their method was to get a starch screen by drying the grains, then dyeing them and sprinkling them on the plate. They found that these starch grains—the diameters of which were about two thousandths of an inch—were very uniform in structure and very transparent, and altogether the best thing that could be found to suit the particular purpose they had in view. They dyed these grains to the three colors: an orange-red, a green, and a violet-blue. A sheet of glass was spread with varnish, and these starch grains were sprinkled all over the varnish. The grains, in the form of circles, of course had spaces between them, which would not do, as they let through white light. So these were filled with a black powder, then the plate was rolled to get the starch grains flat, afterwards covering them with a sensitive emulsion, and the thing was finished. The first announcements were met with ridicule, and difficulties of all sorts were suggested, but the undaunted manufacturers brought out the Autochrome plate some two-and-a-half years ago, and he purchased some of them at the French office of the firm. He carefully calculated his first exposure, buying fruit and vegetables of a great range of color for the purpose, and the successful result of the first attempt was subsequently shown upon the screen and applauded. Referring to the disturbing element known as "frilling," the lecturer attributed his largely successful avoidance of this to the fact that instead of washing the plate well for half a minute under the tap, according to directions, he never let his plate go under the tap at all. He thought it the greatest mistake. He believed the frilling was caused by handling the plate and so detaching the film from the glass. He put his plate into a dish, poured the developer on, and, after allowing it to remain the prescribed time, poured the developer off. He had a domestic bath at hand filled nearly full of water of the suitable temperature, and slid the whole thing into the bath. He then poured the water out and so rinsed the plate without touching it.

Mr. Casson traced subsequent developments, spoke of the modification of the plate and instructions, by which it became possible to see the plate whilst in the course of development, and to carry on the development a little longer than the prescribed time if they thought it needed it, or put a little more ammonia into the developer and so bring the result out. Messrs. Lumière had now gone a step further, and under the latest instructions you simply develop with quinomet, reverse with permanganate, re-develop with the quinomet you developed with, wash and dry the plate. It is extremely simple and enables people to take Autochromes when away from home and develop them with ease. The lecturer had experimented in various ways with the new system, and advised his hearers not to follow the printed instructions too closely. He found it better to work the developer weaker, with one or two drops of bromide.

Directly the Lumière plate was commercially available, other people were stimulated to follow in the same lines. He first referred to the Warner-Powrie plate, ruled with straight lines in three colors, in which the light, instead of selecting a grain of color as in the Lumière plate, selected a portion of a line of color. This plate was never put on the market. The plates familiar to us now were the "Omnicolore," made by Messrs. Jougla & Co. of Paris, and the "Thames" plate, patented by Mr. Finlay, which was now on the market and could be obtained pretty well anywhere.

The Thames plate was made by printing two of the colors in the form of little circles, and the third color in the interstices between the circles. Being mathematically made it had an identical "pattern" in all parts, and every plate was the same as every other. There were two ways of dealing with it—the separate method and the combined method. There was some difficulty with registration, but when this was effected the result was very satisfactory. Like the Autochrome plate, you develop, reverse, and re-develop it once for all, and if successful you get some very pleasing and accurate results. In the case of the Omnicolore plate, the colors were put on in a sort of key-shaped pattern that interlocked with one another.

The lantern slides were then shown, Mr. Casson remarking that the Autochrome results were near to Nature, very true, and very beautiful. The Thames plates produced the brightest and most satisfactory lantern slides, owing to the absence of black "filling," which prevented some of the light passing through.

The Thames plate was a thing of good promise and likely to hold its own. He recommended the avoidance of skies, as, unless the exposure was very rapid, he had found skies were a failure on screen-color plates, and with these very rapid exposures the accompanying landscapes were under-timed. Screen-color plates had not the same length of scale of gradation as some ordinary plates, but if this were borne in mind, and the range of lighting was not too great, they were most successful and reliable.

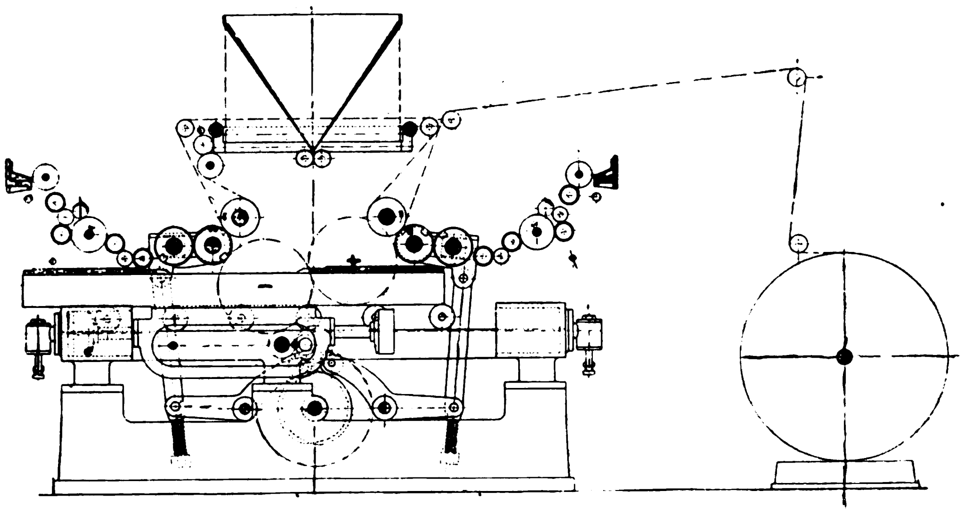
THE VALUE OF CREATION.—Wilkes & Co., Ltd., established in 1860, say that for thirty years they were asleep, practically. They did the best printing they could, carried out their customers' orders promptly and faithfully, and—made little or no progress. In 1902 they began to design, write copy, and give suggestions to their customers, and success came. Amongst other things, they specialised on facsimile typewritten letters—quite a small line, apparently—and built up a big trade, extending all over the country. The idea is one we have often suggested to our readers, that they should "produce, as well as reproduce." A good idea shown to a customer will often book orders where the best of ordinary "canvassing" has failed.

("The Process Photogram.") February 1910

A Newspaper-printing Rotary Machine on "Offset" Lines.

Only about six months ago a well-informed printer-publisher was discussing the future of the lithographic method, and stated, as if it were an incontrovertible conclusion, that the idea of using the offset principle in newspaper printing was a vain dream. This was evidently not the opinion of the Schnellpressenfabrik Actien-Gesellschaft, of Heidelberg, who, almost at the same time that the adverse opinion appeared in print, were placing on the market the first machine in which the rubber offset principle is recommended for newspaper and similar work.

The machine, called the Heureka Press, is diagrammatically represented by the annexed vertical section. The paper is fed from the usual great reel (on the right) over and under three tension rollers until it reaches the first impression cylinder (marked +); then over the other guide-rolls until it reaches the second impression cylinder (marked −), which prints the second side. In this press the rubber offset system, which has been developed in connection with lithographic printing, is used for transferring an impression from *type* to paper by the intermediation of trains of rubber rollers. The type is a flat-bed forme, and as it does not come in contact with the paper and there is no heavy impression, the wear on the type is very slight. The impression is taken direct from the forme to a rubber-covered cylinder, is transferred to a second, which works in contact with the impression cylinder and transfers the matter to the paper. The cylinders make three impressions for each travel of the type, as it is found that one inking of the rubber is enough to give three good prints, and this feature results in great speed of printing, with relatively slow running of the reciprocating part, on which the strain of speed-work falls most heavily. The machine is

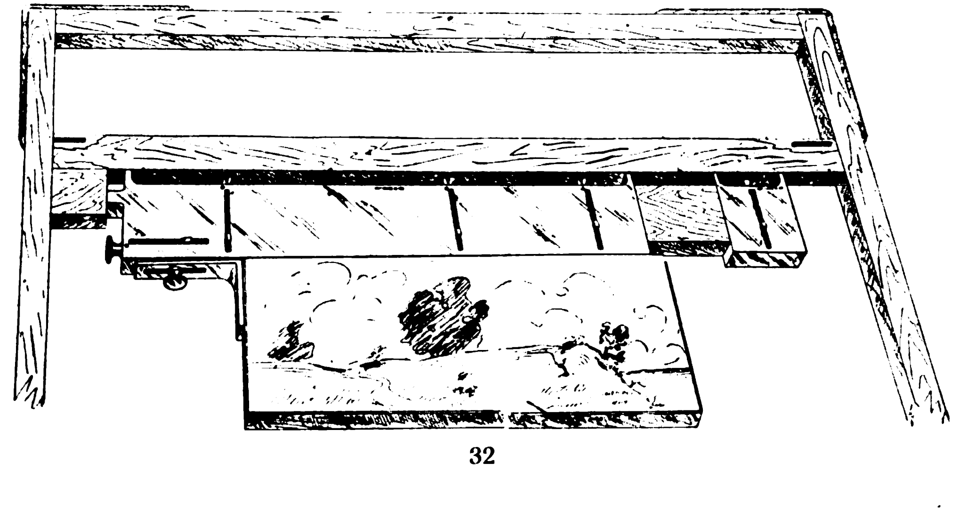


intended to be run at various speeds, up to 3000 an hour, at which rate it delivers 9000 copies, folded.

An important feature in which the Heureka differs from ordinary flat-bed rotary machines is that although the bed reciprocates, the rollers (and therefore the paper) are always running at one uniform speed. When cheap "news" is being printed on the ordinary rotary, from the reel, it is liable to break at the restart, after each impression, a defect that prevents the use of the cheapest papers on many journals where the saving arising from their use would be appreciated. With the constant, even strain of the Heureka, the very cheapest "news" is available.

An Aid to Registration in Proofing of Color-work.

A VERY simple efficient apparatus for saving time in securing register when proofing sets of blocks in two or more colors or tints has just been introduced by the Williams-Lloyd Machinery Company, of Chicago, and is illustrated by the small cut herewith. It is called "the Reliance Proofing Device," and is supplied in two forms, one for blocks up to 16 inches long, and the other for blocks or formes of larger size. The larger section, for the blocks up to 16 inches, is illustrated on the left and has four adjustment screws, three working against the side and one (through a sliding and adjustable angle-piece) against the end of the block. Divided from this by a piece of wooden furniture, one of the small sections is shown toward the right. The small section is used practically as an extension of the larger device, when blocks of greater length than 16 inches are to be registered. In no case is it wise or necessary to use more than three adjusting screws for any job—two at the side and one at the end. For small blocks one or other of the screws in the large section can always be left out of action, and when the supplementary small section is brought into play a second screw in the main section is disused.



No argument is necessary to show that such an arrangement makes fine registration very easy, and that even if the blocks should not be mounted absolutely truly, this will be no serious disadvantage.

The outfit, of iron throughout, and well nickeled, is sold at $16 (£3 18s. 8d.), and the manufacturers show their confidence in its value and efficiency by offering to send it on ten days' trial.

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The Draco Printing-frame.

THE following description is abridged and the illustrations are taken from the patent specification of the process printing-frame illustrated and briefly described on p. 281, in December. The frame is the invention of Dr. Eugen Albert, and is placed on the British market by C. Janzer & Co.

Dr. Albert says:—" It is well known that greater pressure is required in printing on metal than for printing on paper, because the metal surface does not yield, and the planes of the adjoining surfaces are not always exactly parallel. To obtain sufficient pressure, printing-frames with a large number of screws have heretofore been employed, which screws have been tightened to give the necessary pressure. Difficulty has, however, been experienced in getting the screws all tightened to the same degree of pressure, and unless this is done, one tightened more than the rest will take the pressure from them.

"To get the minimum of pressure required over the whole of the surface the screws have been tightened much more than was necessary if the pressure was equally distributed. Notwithstanding this it is a frequent experience to find portions of the negative under-copied, especially in the case of large plates, owing to the unequal distribution of pressure. Moreover, this excessive pressure causes particles of dust which may adhere to the negative while drying to be forced into the metal, producing white holes in the finished plate.

"The invention consists in forming the pressure-giving surface by a plurality of leaf springs supported in suitable supports such that the actual surfaces of contact are widely and regularly distributed. The pressure between the frame supporting the springs and the negative holding frame may then be obtained by a single clamping bolt and nut co-acting with a bracket on the spring frame. In small frames the necessary distributed pressure may be obtained by a row of similar parallel springs extending across the whole width of the pressure frame; in larger frames, alternatively with the springs passing from side to side, are a series of shorter springs, a support for which is added along the centre of the pressure frame, and these shorter springs have the effect of extending the pressure towards the sides. As it is important that the points of contact should not all be in line, the spring supports may be staggered or springs of various length may be employed, so that these points of contact are distributed in two or more parallel lines by which the useful pressure surface is largely increased as compared with the surface available if the springs are in one row.

"The supports for the springs are so placed that when not under pressure they have a small downward curvature, consequently when the pressure is applied the point of contact is extended by the continued compression of the springs.

"In the accompanying drawings fig. 1

Fig. 1.

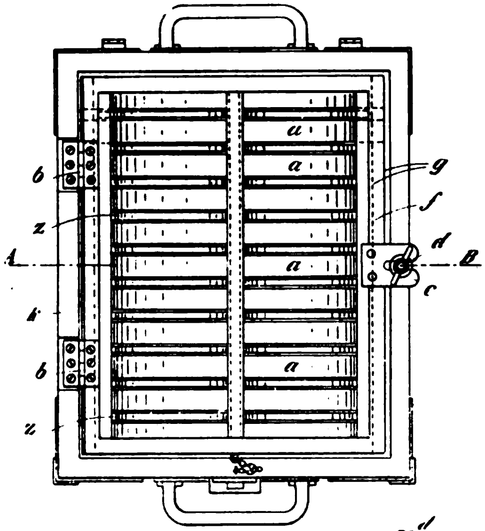
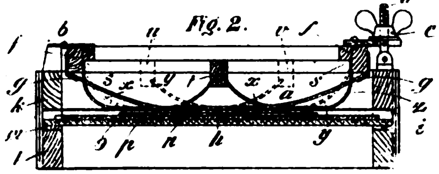


Fig. 2.



is a plan, and fig. 2 a section on the line A–B of fig. 1, showing a printing frame for small or medium plates.

"Here the springs are arranged in three rows: that is to say, *a*, which extend over the entire width of the frame and which transmits the pressure mainly at their middle part, and then two rows of springs *z*, each of which extends over one half of the width of the frame.

"The first row of springs is supported by the sheet metal strips *g g*, provided on both sides of the frame *f*, while the springs *z* rest in an angular recess *s* in the frame *f* on the one hand and in a groove in the strip *t* arranged longitudinally in the middle of the frame *f*, on the other hand.

"The frame carrying the springs *a* is hinged to the printing frame proper, and the pressure is given by means of a wing nut *c* and pivoted screws *d*. The pressure might, however, be furnished by a centrally arranged screw spindle, as in an ordinary copying press.

"The only essential point is that the leaf springs, which are arranged horizontally at a small interval one from the other, should present approximately the same tension, so that pressure exerted may be as far as possible equal everywhere.

When the metal plate *h* is pressed, the leaf springs which are held curved in tension rest upon the indiarubber sheet *i*, stretched on the underside of the clamping frame *k*.

"In order to render the operation perfectly clear it may be explained that *l* is the lower frame, provided with a thick indiarubber layer *m* for the copying glass *n*. The ruled screen *o* rests upon the glass, and the negative *p* upon the screen contacting with the prepared metal plate *h* on its opposite face.

"At first only the summit of the curve of the springs bears against the indiarubber cloth, but as the pressure increases a larger part of the spring gradually presses against this cloth, whereby the pressure exerted on the wing nut is distributed over a larger area. The pressure applied should not be excessive, however, as otherwise the middle of the spring might be lifted or buckled, which would react prejudicially upon the efficiency of the apparatus."

HALF-TONE IS IMPOSSIBLE, or almost impossible, if one is to obtain a harmonious feeling in a type-display advertisement, according to Mr. French when speaking for the Technical Publicity Association, New York. He added: "Personally, I am very glad to see the renaissance of the line engraving, or the pen and ink sketch in the work of advertising. It doesn't 'hog' all the attention given to the advertisement."

Advertising the Engraver.

By C. Hargreaves.

The adage that a cobbler's children are the worst shod might very truly be applied to the majority of photo-engravers.

The process trade very largely depends on the requirements of advertising, in which illustration plays an important part, and its recent rapid growth has been due to the development of advertising as a selling force. Engravers, except a small minority, have paid no serious attention to advertising; they have perhaps been too busy obtaining work by price-cutting to seek for a better method, forgetting that a reputation for good work is a sound business asset but the name for low prices is a doubtful compliment.

Advertising, when thoroughly carried out, is not simply a means of diverting orders into another direction, but is a creator of new markets.

As an example of this an advertising campaign promoted by the Greek Government is at present in progress. The currants grown in their country monopolise English markets, and the sole object of the Greek Government in starting this advertising scheme is to educate the public as to the dietetic value of the currant and thus *increase the consumption.* A similar case is that of the State of San Paulo, whose staple product, coffee, was being grown greatly in excess of the demand. They have not allowed the priests to be cut by the planters; but finding on examination that the amount of coffee consumed by the English was extremely small when compared with that of other European countries, they have given their coffee a distinctive name and are carrying out an energetic advertising campaign. The result is that the grocer in this country who does not sell "Pazenda" coffee is an exception. Increased consumption is bound to be the result.

Currants and coffee are not process blocks, but one has only to take up a magazine or paper to see the extensive range of articles that are being sold through the use of printer's ink.

In the printing trade the commercial traveller will always be an important factor, as each piece of work requires a different specification and he is necessary to interpret the wishes of the customer. In process, however, the work is divided into distinct classes, which are easily recognised by the customer, and it is rarely that he is unable to communicate readily his wants.

Just as the many large London stores often merchanting the same goods at uniform prices compete with each other by proclaiming the qualities of the goods, promptness of delivery, and attention to instructions, so it should be with engravers. There are throughout the country a large number of process houses turning out first-class work at almost uniform prices, who can by a just appreciation of the value of advertising disregard the firms that are, and will be in all trades, profit-cutters through their inability to hold their customers by other means. With the exception of a few firms who could be counted on the fingers of one hand, the advertising at present done by the process trade can best be described as haphazard. Briefly, it consists of announcements in trade journals and business magazines requesting applications for specimen books.

Little determined effort is made to

convert the inquiry into an order, and when a customer is made, he is not continually kept in touch with to prevent him being drawn away by some other specimen book or cheap prices.

An analysis of the process advertising compiled from recent numbers of three leading journals, namely, *The British Printer*, *The Printer's Register*, and *The Advertising World*, reveals the fact that of thirty-nine announcements fifteen were printed from blocks, nine from blocks and type combined, and fifteen from type only! and these were the advertisements of blockmakers. Now that the present position has been broadly described it remains to be shown how the present expenditure could bring in greatly increased results with a very small addition.

But first as a warning. Before starting, the best plan of campaign must be decided on, and then it should be steadily followed out. Immediate results may not come, but if one is working on the right lines they will come. Advertising returns are like a snowball which steadily accumulates as it is rolled along, but if stopped grows no bigger and finally melts. Commence modestly but persistently, and increase the expenditure as the results are attained.

Before entering into an advertising campaign be sure that the quality you are offering is fully equal to that supplied by competitors and that you are organised for turning out work on time, as quality and punctuality are your two strongest features in appealing to advertisers and printers.

Although many schemes might be propounded, the following is a sound one, and has the advantage that the results can be carefully checked while it may be carried out equally efficiently on a large or small scale. A specimen book must first be produced. It should be made as interesting as possible and of some practical help, in order to ensure it being preserved.

The next step is to obtain two card index drawers. One of these should be labelled "Customers," and a card should be made out for each name at present on the books. It should read somewhat as follows:—

JOHNSON, B. E., & SONS,
11 Sydney Street,
Birmingham,
Manufacturing Opticians.

Specimen Book.	Letters.		
	1	2	3
18/2/09.	28/2/09.	7/3/09.	

The names should be subdivided by the guide cards into (1) local, (2) country, (3) local printers, (4) country printers, and arranged alphabetically. A fifth guide should be for all names on your books with whom for some reason no business has been done recently. These names are for following up specially.

The other card index drawer should be labelled "Prospects," and should be divided into the above four sections. The fifth section, of course, is not required. This list of prospects must be steadily compiled as requests are received for specimen books, and to these might also be added the names of likely firms in your immediate vicinity, to whom a specimen book should be sent. As these "prospects" become customers the cards would be transferred.

Magazine advertising is primarily to obtain new inquiries, although it also keeps in touch with those who already are customers.

It is not sufficient to simply announce

your name and business with the fact that you make the "best blocks" or the request "write for specimens." The assertion "best" nowadays carries no weight, and if simply combined with "write for specimens," is apt to draw a large proportion of casual inquirers, which would therefore give poor results when followed up.

The advertisements should contain a series of convincing arguments adapted to the class they appeal to, with a footnote in smaller type inviting requests for specimen books from those interested in good blocks.

Let each advertisement be set out in simple, straightforward language, short and to the point and drive home one argument.

In arranging an advertisement the exclusive use of a block is not always best, as engraved lettering is rarely so legible as type. A block should always be some part of the display; it might perhaps be the border or some suitable illustration suggested by the headline, which might itself be engraved in order to attract additional attention. Whatever character the block may be, let the original design be prepared by a first-class artist, as the quality of the design will be reflected on the blocks.

Each advertisement should be "keyed"; that is, when inviting inquiries, applicants should be requested to address a special department, so that it can be seen which advertisements and which journal brings most results. You will thus be able to see which advertisement brings the best inquiries, and can quickly withdraw the advertisement which attracts little attention. An accurate record should be kept of the results, as it will soon enable you to decide which medium gives the best results, and the style of advertising which is suited to each medium. By this experience a high degree of efficiency will gradually be obtained.

After an inquiry has been received, and a specimen book accompanied by a short business-like letter has been sent, it remains to turn the inquiries into orders. If the firm is close by, a personal call should be made. If not, the most effective means of following up all books is by an original typewritten letter.

There should be at least three differently worded letters, to follow each other at intervals of ten days. As each specimen book is sent out the date should be marked on the index card, and also the date when the follow-up letters are sent, in order to avoid duplicating any letter, which would completely annul the effect.

When a reply has been received which is not an order, the card should be withdrawn from the drawer for the purpose of special correspondence.

The next step is to prepare a series of small advertising matter to send out once a month to "customers," and also "prospects" whom the letters have not convinced.

If after six months' fusillade no reply is produced, a polite note, enclosing a stamped envelope, should be sent. If this produces no reply, the name may be given up as hopeless.

It may seem unnecessary expense to continue sending out advertising matter to your customers, but it is an insurance policy on your keeping them. You may also be doing only a small portion of their work, and as the advertising should be of an educative kind to stimulate the use of blocks by means of suggestion, it should very readily increase their accounts.

When first obtaining their business, you appealed to them chiefly on quality and punctuality. As you are now producing their work it should not be necessary to emphasise these arguments. But you should aim at increasing their variety of work.

Customers' accounts should be carefully watched and a series of form letters arranged for those in which there is any falling-off. Persistent advertising on lines similar to the above cannot fail to give good results at better prices, providing you are organised for quality and punctuality.

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American Machine-printed Photogravure or Mezzogravure.

Though it has been worked successfully for many years in England, machine-printed photogravure has not made such a general impression as it seems likely to do in the United States. Not only are its prints being pushed vigorously by the Mezzogravure Company, but a process, with apparatus and materials, is being offered to American photo-mechanical firms. Very few technical particulars are published, but the following notes and prophecy, from the close of a long, interesting, historical article by George Vickers in *The American Printer*, cannot fail to interest our readers:—

"Many details of the process, which were attained after years of effort, are secret, but this much may be said:

"The subject is photographically reproduced on the copper plate, which is placed in chemicals and etched until—like the photogravure — the cavities correspond with the depth and variety of color in the original. The finished plate is cleaned and placed in a specially constructed machine which does just what the photogravure printer does with his plate, only more accurately and much more expeditiously. The plate is automatically flooded with ink, which is forced into the hollows. Next it is wiped until the surface is bright and shining, but the etching stands out in black. The paper is mechanically laid on and the whole subjected to tremendous pressure, which forces every particle of ink from the deepest recesses on to the paper.

"The resulting mezzogravure is the highest achievement in the art of mechanical reproduction. It possesses the depth of color of the mezzotint, the detail of the steel-engraving, the softness of the photogravure, and resembles the half-tone in being practical in a commercial way.

"Ralph I. Bartholomew, secretary of the Mezzogravure Company, was seen by the writer, and was asked what effect the invention of the mezzogravure was likely to have on the half-tone industry.

"He said: 'There has never been any question about the artistic superiority of the intaglio plate, represented by the photogravure, the mezzotint, steel-engraving, and now the mezzogravure, over the surface-printing plate. The fact that intaglio plates can be successfully printed by machinery means that now they are commercially possible. There is no doubt that they will supersede the half-tone for the more artistic work. The half-tone, however, has many valuable features, and will continue in use for many years to come. It is an excellent means of reproduction, inferior only to the intaglio plate.

"'Many new firms will enter the intaglio field, and as a result new and perhaps better methods will be devised for executing the work. We cannot but feel that we are pioneers, who have made a clearing, and fashioned the tools with which to do our work. It will be easier for those who follow. While we would be very reluctant to part with the secrets we have learned after great effort, we shall be very glad to see others enter this attractive field. There will be plenty of room for everybody for years to come. In fact, the demand for this work is likely to increase faster than the manufacturing facilities.

"'The invention of the mezzogravure process will do for art what the invention of the printing press has done for literature. Just as in the fourteenth century, books, laboriously inscribed by hand, could only be purchased by the very wealthy, so in the nineteenth century the hand-printed photogravure found its way only into the homes of the well-to do, while those of lesser means had to be content with cheaper and less artistic engravings.

"'This is now changed. Mezzogravure machines, replacing the hand photogravure presses, can produce prints of the highest artistic excellence in such quantities that it will be possible for the farmer, the artisan, and the day laborer to have on the walls of their homes copies of the world's masterpieces, scenes from every country, portraits of the great—in short, everything that was formerly produced in only limited editions. It is as if Leonardo de Vinci should multiply himself a million times, Michael Angelo build ten thousand St. Peters' to delight the eye, and the splendid panorama to be seen from Jungfrau brought before every man's front door. As a result, it is possible that there will be a revival of the arts that has not been known since the days of the Renaissance.

"'The commercial uses for mezzogravures are almost innumerable. Printers find that mezzogravure frontispieces greatly enhance the quality of their choice catalogues. Mezzogravure covers are both unusual and highly artistic. Book publishers are now able to illustrate large-edition books by this beautiful process, which, heretofore, has been confined almost exclusively to *de luxe* editions. The newspaper publisher, through the medium of the Sunday supplements, is going to be a large factor in the distribution of real art prints into the homes of the people throughout the country. Thus the newspaper will continue to be the greatest educational force known to modern civilisation.

"'Possibly the discovery of mezzogravure means more to the advertiser than to any other class of users. These forceful men, who are now recognised as the highest sales authorities, and who are creating markets for their goods in ten thousand communities, have long appreciated the necessity of some more artistic method of illustration than the half-tone. Lately they have tried the combination of dull-finished coated paper and two-tone ink, to obtain a "photogravure effect." Now it is possible to use genuine mezzogravure plates, which possess all the high art qualities of the photogravure. By the use of this new process it will be possible for the advertising man to hang his picture in the home of the consumer—constantly before him—and his friends—a perpetual reminder of the advertiser and his goods.'"

The Usual Process Methods.

An Address by Mr. A. J. Newton at the Bolt Court School.

Mr. Newton said that having had the opportunity of visiting some great continental works recently, and later of going over some big establishments in the provinces, he would speak of the developments taking place, and the lines on which progress was being made.

Bad Originals, and Good.

To-day it was appalling to think of the originals that artists gave the process man to work from. If the artists took the trouble to understand what was required, the resulting reproductions would be much better and infinitely more satisfactory. He did not say it was worse now than at any other time; in fact it was probably somewhat better. Only the previous day an artist who complained bitterly about the reproduction of his work brought along a proof and also the original, which was a flat bromide print of one of Turner's paintings, on which he had put patches of burnt sienna on one part and Chinese white on another. Using ordinary water-colors which were very sloppy, without preparing the surface of the print, the result was that when he put them on the paper it ran in blobs. When photographed it came very dark in the centre of the blobs and light where the blobs had run. It was quite possible for a reproducer who thoroughly knew his business to get a better result than had been done in this instance, but it was not necessary for the artist to give him that trouble. Had the artist known what was required, and how defects were caused, he would have produced a better original.

With line work it was just as simple to draw properly as improperly. Line work was sometimes drawn in brown ink on yellow paper, and nothing was more disheartening to deal with. They should be drawn on good white Bristol board, with opaque black Indian ink.

Operators' Work and Training.

Most operators realised how necessary it was, when making the negative, to have technical knowledge of the best methods to adopt for particular purposes. But, generally speaking, they needed more training and the exercise of careful thought to realise the intention of the man who drew the original, and what he was expected to produce. He also needed to know what the negative was going to be used for. For the intaglio plate they did not want the same dot that they did for the ordinary half-tone.

Printing on the Metal.

Referring to metal printing surfaces produced from negatives, Mr. Newton said that splendid results could be got with due care from the albumen process, but he thought that with enamel in place of albumen they would stand a much better chance. This was a case in which the craft had not gone forward in quality, though they might have done so in cheapness and speed. A recent process was the cold enamel, in which the metal plate was coated with resin or shellac as an acid resist. The process had not become generally popular, because developing the shellac away was very troublesome. The object of the method was to prevent the operator having to heat the zinc which was able to stand the press better in consequence. This was the basis of Albert's process, of a process sold by Penrose's, and of the Paynetype process, which Mr. Payne had consented to describe at the School.

Etching Machines.

Mr. Newton next referred to the contention as to which was the best etching-machine on the market, and concluded that any of those now on offer was better than the old hand-rocked tub. He had seen a new model of the two-fan "Axel" machine which was used all over the continent with much success. The "Mark Smith" machine was similar and very satisfactory indeed.

The Powdering Process.

It was surprising that the powdering-up process had not made more headway in England. They could get equally good results with either rolling-up or powdering, but they got the best results easier by the powdering-up process. People who etch plates in England by the hand method did not use the powdering-up plan, but the use of Levy's powdering machine had forced them to adopt dragon's blood, with which they got a sharper and better block, while in lettering particularly, the serifs, etc., were held better by dragon's blood than by rolling-up.

Reduction of Fine-etching.

A tremendous amount of fine-etching was largely due to the fact that the persons who performed the original operations had not been sufficiently skilful. In three-color work—in spite of its exceptional difficulties because of imperfect plates, filters, and inks—if the process was properly understood they could approximate to the original. If not, something was wrong, and should be inquired into before anything further was attempted. The expense of fine-etching on three-color work had held back the process a great deal.

A Growl about Mounting.

They were still dissatisfied with wood for mounting. It would be impossible to print in three colors thirty-two blocks, of more than 5 by 3 inches in size, on a sheet if they were mounted on wood. The latest substitutes for wood that he had seen were clumps of iron which filled up the whole of the chase solid; this and an ingenious screw quoin enabled perfect register to be attained and kept. This was very heavy, and what was really needed was some kind of composition that would stand locking up in the printing frame, into which they could drive nails, that was not too heavy, that was inelastic and not affected by weather.

The New Albert Process.

Referring to this process, which was illustrated by a very large monochrome print on the wall, Mr. Newton said:—"You take an ordinary full-tone negative, a piece of prepared zinc having on it first a coating of resin and then a coating of fish glue, and place the sensitised film of the zinc in contact with the negative. These are placed in a printing frame in which there is already a cross-line screen. If you try that you will find that after long exposure you get nothing at all. If you wait long enough you get over the whole of the image dots of the same size. That is no use, because what you want on the print is dots well joined up in the shadows and only open in the high-lights. The reason for this is that in the fish-glue film the light only gets to the centre of the cross-line screen aperture. Dr. Albert overcame this first by oscillating the printing frame, then he tried revolving the frame, and lastly he now oscillates the lamp."

PHOTOLITHO.

Photolithography next came under notice, several examples of which were in the room. Speaking of those by the Frey process done in Zurich, Mr. Newton remarked that this process had not been successful over here. An interesting application of photolithography was the mixture of letterpress and litho. In this an orthochromatic negative was made, and from this a screen negative, which provided a black printing block. From this set-offs were taken and put on to metal or stone as guides for the color-stones or plates. It was very cheap, and the effect was very good. It could not be got by the same small number of printings in lithography alone.

AND AUTOMATIC FEEDING.

The Cross automatic feeder was praised as giving much better register than had ever been secured by hand-feeding. The mere leaning of the feeder against the feeding board would cause a difference in register, which was entirely obviated by the automatic feeder. The work went along continuously, and if the conditions of working were right, there was no need for any variation in three-color work. That was a great triumph, which meant a great increase in color-work in the future.

COLOR-COLLOTYPE

was often said to be useless, or a dead process, an idea which Mr. Newton ridiculed, in view of the great market found for the beautifnl and expensive color-collotypes produced by some of the firms in Vienna and Berlin. He had asked in some of these houses how much retouching there was on some fine color-collotypes, and was told that each of the three negatives usually took a skilled man a week to retouch. He inquired about correction and re-proving, for subjects which required re-proving had to have fresh plates. He was told that the number of re-provings sometimes went to as many as seven. Loss by waste amounted to 15 to 25 per cent., and another firm said they never had less than 25 per cent. waste. That showed the difficulty of doing the work. He thought English collotypers had the skill but not the patience for such work. The British public had such a habit of getting illustrations done in a hurry that the customer would not allow time for the production of best results. Patience was wanted on the part of the customer, employer and workmen.

OFFSET PRINTING

was described as an extremely simple process, in which the printing was done on a metal plate — curved around the cylinder of the press. From this plate the impression was transferred to a rubber blanket, and thence to the paper. As it was done on a rotary machine the speed was very high. A great advantage was that they could print on any sort of paper—hard or soft, rough or smooth, cheap or good. Being done so much quicker than ordinary lithography, the establishment charges were much less, and thus no doubt it affected a great saving.

A BLOCK-PATCHER.—Chas. P. A. Giraud, of Chicago, specialises in the repair of blocks, and has issued a circular to the printing trade wherein he says:—"Expert repair work is my specialty, and my prices are at all times within reasonable bounds. I am prepared to repair all kinds of printing plates, be they wood, half-tone, zinc, wax, metal; embossing nickle-types or electrotypes, whether they be mashed, scratched or bruised, I guarantee to fix them so you can use."

Emulsion and Screens.

WITH the gradual introduction of collodion emulsion for direct use in making half-tones, new problems arise in connection with the screen best adapted for the purpose. The problem is of the same nature whether collodion emulsion or the gelatine dry plates be employed, and arises from the circumstance that the haloids are not so finely subdivided as they are in a wet bath plate, and consequently the emulsion film is less transparent than the film prepared in the bath. The coarser particles contained in the emulsion have a distinctly dispersing action on the light, which is usually greatly in excess of that of the bath plate, and this dispersion results in an exaggeration of the delicate images produced by the screen apertures, tending to exaggerate them and produce a "fuzzy" dot. This difficulty is largely, if not entirely, overcome by making the opaque lines of the screen somewhat heavier, and the cover-glass somewhat thinner, than is customary for screens to be used in connection with the wet process. So far experience has shown that the loss of light due to the thicker lines is not felt because of the greater sensitiveness of the emulsion. Where screens are destined for use with emulsions, it will be greatly to the advantage of the operator if this fact is stated in ordering, so that the screens may be made accordingly.—MAX LEVY, in *Process Work.*

The Paynetype Process.

A Lecture delivered at Bolt Court School by Arthur Payne, F.R.P.S.

IT is an interesting fact which I feel sure will be appreciated by all who have the welfare of this institution at heart, to know that if your Principal had not written a certain short paragraph it is extremely doubtful if I should be lecturing before you this evening. This paragraph, which inspired me to make the series of experiments that have eventually evolved into the Paynetype process, appeared on page 119 of *The Process Year Book* for 1902–3, and read as follows:—

"If it is desired to attack a problem of more importance, there is the question of direct photography upon the metal plate. To solve this is, I am convinced, only a matter of a certain amount of patient persevering work, but imagine the momentous results it would have upon our craft."

The paragraph appeared, as I have already told you, in December 1902. But it was not until five years later, in December 1907, that I read these lines, and after a few preliminary experiments I filed a provisional specification on Christmas Eve in that year. From then until within the last two or three months the whole of my spare moments have been concentrated on this problem, and although the process now appears to be so simple and easy, the work at times was almost heartbreaking. My first results were weird in the extreme, but I persevered, for I felt sure that I had the germ of the idea; and although the process as yet is only suitable for the coarser branches of line and half-tone work, it may eventually lead to more far-reaching results.

I propose in the first place to explain the process in detail, afterwards proceeding to its employment in the various branches of photo-engraving for which it is suitable, and finally to consider the economic value of the process.

The most novel and important feature of the Paynetype process is the prepared metallic plate, which may be purchased ready for use in a similar manner to ordinary glass dry plates. Though the process is applicable for both zinc and copper plates as well as other metals, it appears to be more particularly adapted for use in zincography, and at present it is proposed only to supply plates coated on zinc; but you will understand that other metals, such as copper or brass, may be employed if such be desired.

The prepared plate consists essentially of a metal plate—in this case zinc—coated with a suitable resist or varnish upon which is coated an extremely thin layer of a gelatino-bromide emulsion. The resist may be composed of a variety of materials. I have employed collodion, gum dammar, bitumen, dragon's blood, and shellac among others. Its function is to prevent chemical action between the emulsion and the metal plate, and also to act as an etching resist when the plate is etched without reversal, or to assist, as you will see later, in the process of reversal. It is, of course, necessary that it should be homogeneous and also readily soluble in some solvent, such as alcohol, benzole or ether, that does not attack gelatine. It also must not be affected by the alkaline developer, the bichromate solution or the emulsion.

[Paynetype Process is protected by patents in Great Britain and abroad.]

(*To be continued.*)

Collotype and Photo-litho.

IT IS LONG since we have given a heading to the intaglio processes, but there are signs that machine-printed photogravure is rapidly "coming to its own."

ANOTHER NEW OFFSET PRESS, to print from the reel, but intended for jobbing and not for newspaper work, is announced in the United States. After printing, the machine cuts the paper into sheets of any required size.

YET ANOTHER OFFSET PRESS, to print both sides of a sheet at the same time, is said to be on exhibition in New York. A contemporary says: "The only objection to it so far discovered is that it won't print."

A ROTARY PHOTOGRAVURE PRINTING MACHINE has been patented in France recently by E. I. Obermeyer, who claims as a special feature a means of lifting the paper (continuous, from the reel) in and out of contact with the printing roller. Thus blanks and margins can be left.

SOME REASONS FOR USING PHOTOGRAVURE are sent, "with the Compliments" of Allen & Co., Ltd., of Clifton Street, Finsbury Square, London, E.C. The reasons are in five paragraphs, each of very few words; but the most telling "reason" is the illustration, a beautiful photogravure after a landscape by J. C. Hook.

SPECIAL CROSS-LINE SCREENS for rotary photogravure are being made by Max Levy, and we receive the first note of a special offer and push of them from the Ostrander-Seymour Company of Chicago. The screens have two sets of thin transparent lines in a densely black field, and as these have to be brought into close contact with the plate, they are not covered with glass. The standard ruling is 150 lines to the inch, but finer and coarser rulings are made to order.

MACHINE-PRINTED PHOTOGRAVURE in England is said to be on the eve of a most sensational and important announcement. A certain London man, well known in the process world, has something very big "up his sleeve." It is not on the old lines. It does not require a "wiper" or "doctor." It is not printed from engraved copper rolls. It is specially commended for very fine and for color-work. It is much cheaper in working than anything yet achieved, and it can be printed on cheaper paper than it has been possible to use for any form of intaglio printing hitherto.

Did someone whisper "photogravure-printed newspapers?" The inventor of the process says, "No! certainly not, at present. At least, not halfpenny morning papers, though we may have cheap excellent weeklies."

We shall wait with much interest.

Publications.

Penrose's Pocket Book and Diary for 1910.—This practical pocket book again reaches us, of a size convenient for the pocket. The diary is arranged one week to a page, and gives pages for cash accounts, memoranda, etc. It also comprises a very useful section for process workers, with valuable instruction for many processes. The matter has been brought quite up to date, instructions for the recently introduced process of Paynetype being included.

Hunters' Pocket Book and Diary for 1910.—For facilitating the carrying of this diary in the waistcoat pocket Messrs. Hunters, Ltd., have this year reduced the size and thickness of the paper. Besides the useful diary and memoranda pages, there is a most valuable collection of formulæ at the end, for the many processes that the engraver needs. Further than this, practical hints are given for the care of lenses, prisms, mirrors, cameras, screens, arc lamps, routing machines, etc. Instructions for the Autochrome process and much other helpful matter is included.

Publications received.—Encyklopädie der Photagraphie (Halle-a-s, : Wilhelm Knapp).

The following additions of interest to process workers have been made to this library:—

No. 60. *Die Theorie und Praxis der Farbenphotographie mit Autochromplatten*, by Arthur F. von Hubl. (Price M. 2.)

No. 63. *Moderne Photographische Kopierverfahren*, by Dr. Erich Stenger. (Price M. 2.)

No. 64. *Die Panoramenapparate*, by Prof. Dr. F. Stolze. (Price M. 3.)

No. 65. *Allegemeine Asthetik*, by Dr. Willi Warstat. (Price M. 3.)

No. 66. *Photographie als Lehr und Forschungsgenstand*, by Dr. R. Luther. (Price M. 1.)

Specimens and so forth.

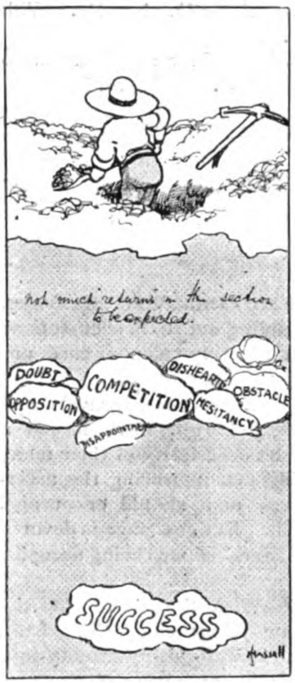
The Irish Photo-engraving Company, Dublin, are sending out to their customers a tastefully designed monthly calendar card, one side of which can be used as a blotter.

H. Kollien & Co., process engravers and designers, Edinburgh, have issued a well-illustrated booklet descriptive of their many departments, forcibly demonstrating the assertion, that all process men should encourage, viz. that pictures talk. But one page is devoted to text, the whole of the remainder being occupied by illustrations.

"Our Works."—With the above title the Acme Tone Engraving Co. Ltd., Watford, Herts, issue a well-got-up twenty-four page booklet. At each opening one page is devoted to descriptive matter with the opposite page filled with illustrations of the many departments of this firm. It is printed in two colors, and should make an effective traveller wherever it is sent.

The Eclipse Electrotype and Engraving Company, Cleveland, continue their enterprising propaganda of publicity booklets. "About Cuts" is the title of that most recently issued. Each page of the well-thought-out text matter is effectively encased with an artistic framework of design, which being printed very faintly gives effect, without detracting from the matter meant to be read.

Election Posters have recently brought more grist to the half-tone mill than in any previous Parliamentary contest. Many process houses have issued special advertisements to candidates and agents, but the first to reach us came from the Arthur Cox Company, just a few days before the election was known to be inevitable. A batch of specimen half-tone portraits, with a variety of cabinet border designs, and with a fine half-tone poster, came prefaced with the words—"General Election Very Shortly—'so they say'!" In trade, as in journalism, a little "intelligent anticipation" is very valuable.



A man can't dig much with his hands.

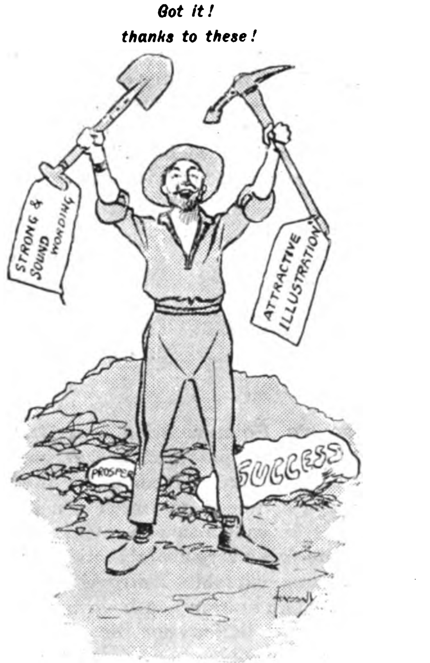
Spade and pick represent our aids to publicity, and the more they are used the brighter they get.

This section is sure to be met with and must be gone through.

Keep pegging away. IT'S THERE.

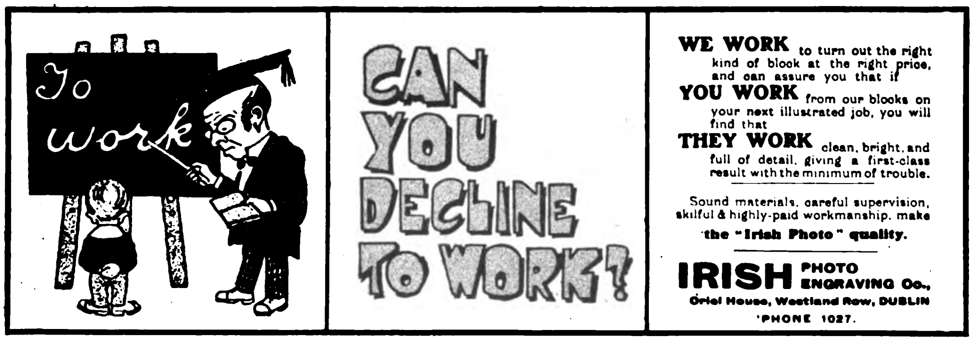
FROM A BATCH of well-designed and "catchy" advertising matter issued by the Irish Photo-Engraving Company we take a design for a "blotter." The great reduction and the use of one color instead of two (the original is in black and red) rob it of much of its striking effect, but even in our little illustration it shows originality and a bright idea. Such advertising is calculated to induce the alert tradesman to ask the Irish Photo-Engraving Company, not only to reproduce, but also to design announcement matter for him.

"WHAT'S WRONG WITH TRADE?"—Such is the title of a cleverly-worded booklet issued by Carl Hentschel, Ltd. The interest in this book is sustained from cover to cover by the tersely written matter and the quaint yet forceful illustrations, two of which we reproduce.



THE RESULT.

THE ARTHUR COX ILLUSTRATING COMPANY, LTD., continue their explanatory vocabulary of printing trade terms in another edition of their card blotter. Good examples of fashion half-tones from wash drawings are being sent out to printers, for whom this Birmingham firm specially cater.


To work
CAN YOU DECLINE TO WORK?

WE WORK to turn out the right kind of block at the right price, and can assure you that if **YOU WORK** from our blocks on your next illustrated job, you will find that **THEY WORK** clean, bright, and full of detail, giving a first-class result with the minimum of trouble.

Sound materials, careful supervision, skilful & highly-paid workmanship, make **the "Irish Photo" quality.**

IRISH PHOTO ENGRAVING Co.,
Oriel House, Westland Row, DUBLIN
'PHONE 1027.

Trade Notes.

De Reproductie Compagnie has a fine new factory at 81 Teilingerstraat, Rotterdam.

H. Rheinlander & Co., Ltd., process engravers, have removed from Sandland Street to new premises, 65 Fore Street, London, E.C.

The Aerograph Company, Ltd., notify us that they have made arrangements for Mr. G. Barnett, who has represented them in the north of England, Scotland, and the Midlands, to cover a wider field, in order that he may take the place of Mr. Aufholz, who has now left their employ. Arrangements will be made as far as possible, for Mr. Barnett to keep any appointments made, and also to give any instructions in the use of the Aerograph to new buyers.

School Notes.

The Bolt Court Lectures for the month are:—February 3rd, A. C. Jolly, Esq., "Electrical Equipment of a Studio"; 10th, J. A. Corey, Esq., "Recent Experiences in Electrotyping and Stereotyping"; 17th, C. E. Kenneth Mees, Esq., D.Sc., "The Rendering of Green and Blue in Three-Color Photography."

"The old school," 6 Bolt Court, Fleet Street, E.C., will be vacated at the end of the present session. The new school is to be built on its site, but even had it been found necessary to move from the heart of printerland, the old name, which has become almost a trade-mark, would have been retained and we should still have been able to refer to Bolt Court School.

At the Municipal School of Technology, Manchester, the students of the photomechanical section organised a dinner which was held at the Mitre Hotel on December 4. Dr. A. T. Lakin, the President of the Manchester Amateur Photographic Society, took the chair, and Mr. Charles Gamble, the head of the Photography and Printing Craft Department, was the guest of the evening. A very congenial time was spent, and the chairman, in the course of a delightful speech, made reference to a scheme for the formation of a technical section of the M A.P.S. which will shortly mature. It is hoped that the idea will prove successful and arouse an increased interest in technical work. The menu-card was somewhat exceptional in design, and was entirely the work of students of the department.

The Annual Conversazione of the Municipal School of Technology, Manchester, was held on December 18. There were about eight hundred guests present, who took great interest in the many illustrations of the various activities in the school.

The photographic section was devoted to an exhibition and demonstration of the various branches of color photography, including the Ives lantern photo-kromskop and an admirable collection of Autochromes and Thames color plates kindly lent by Mr. S. E. Bottomley, F.R.P.S. The programme was prepared in the department, and showed the quiet good taste which is characteristic of the printing of the School.

Brevities.

Paynetype is described in a pamphlet obtainable free from Penrose & Co., Ltd.

The Technical Publicity Association is a new society of advertising men in New York.

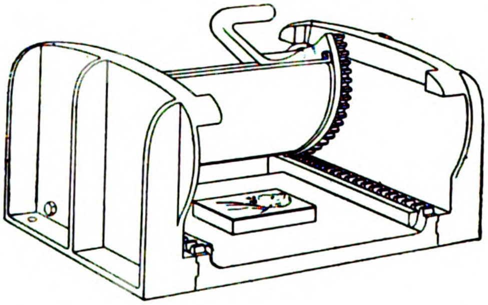
Mr. W. A. Casson, whose lecture is reported in this issue, is a member of the London County Council, and is one of the nominees of that body on the Advisory Sub-Committee which reports to the Technical Education Board of the Council upon the working and the needs of the Bolt Court School.

Colebrook Breaks the Ice.—Frank Colebrook, the friend of everybody in the British "process" world, is an enthusiastic swimmer and diver, frequenting Highgate Ponds. He won the first place in the senior handicap in the Highgate Lifebuoys' swimming competitions on Christmas day.

Repro paper is a paper specially prepared for producing line originals by the method of printing photographically, drawing with ink over the print, and bleaching out. It has a specially selected surface, with fine tooth, to take pen-work, and the image will bleach out cleanly. No special instructions are necessary, except that the paper should be kept in its original wrappers and stored in a dry place if it is to be stocked for a long time. Price 10d. per single sheet, or 16s. a quire, size 24 x 18. Penrose & Co., Ltd.

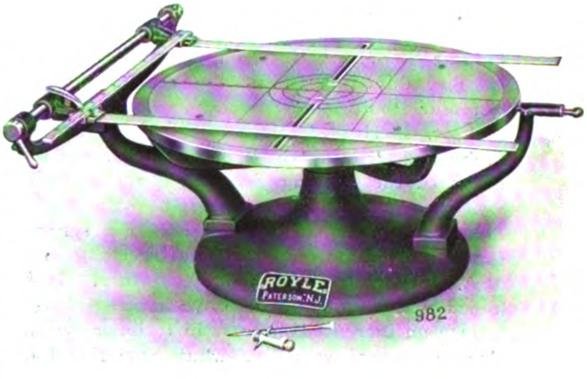
V

THE VANDERCOOK PROOFING PRESS is described in *The Printing Trade News* as a new piece of American simplification which has advantages for proving blocks and small formes. As is shown by the cut, it consists of a semi-cylinder having cogs around the convex side at each end, and a handle at the centre of one end of the concave side. The cogs engage in racks on the bed of the press, and each end of the press has a planed way, or guide, along which the end of the semi-cylinder runs. At each end of the guide-way is a shoulder stop, checking the semi-cylinder when it has been pulled over to its proper distance. The impression is given by the weight of the semi-cylinder, and by this method, in which the whole weight is placed on successive small portions of the block, far less total pressure is needed than when using a flat platen that presses all parts of the work at once. A heavy pressure per square inch is obtained from a total weight that is not at all difficult to pull over, and the arrangement is calculated to avoid any slur in the impression. Very good proofs are said to be obtainable on such a press, with great economy of time and labor.



THE OSTRANDER-SEYMOUR COMPANY'S catalogue of photo-engraving machinery, apparatus, and sundries, is a handsome list of 264 pages, well illustrated, and dealing with a wealth and variety of patterns of apparatus. Amongst the newer items we notice the Kollmorgen Process Lens, for which it is claimed that it is equal, if not superior, to the finest pre-existing lenses in all desirable qualities. In one direction at least it is distinctly superior, namely in entire freedom from zonal or secondary spherical aberration. (This same quality, by the way, is specially claimed for the Ross homocentric also.) The Kollmorgen lens is of four single uncemented elements of white glass, free from any tinge of yellow, and makes claims that are at least well worth investigating, especially as trial for an ample time is offered. A very interesting series of electric lamps for all purposes is described; the various grains of mezzograph and ordinary cross-line screens are well illustrated; and in this section we find the first detailed offer we have seen of cross-line screens specially for machine-printed photogravure. Machinery, cameras, chemicals, and "oddments" of many kinds, including several very useful ingenious contrivances, are described and illustrated.

THE ROYLE NEGATIVE SQUARING MACHINE is another appliance for facilitating the work of the process worker. This machine provides a ready and accurate means for squaring negatives used in photo-engraving, for either stripping or to establish lines for guidance in blocking. It consists of a ground-glass, circular table encased in a metal frame, which revolves on a pin set in the socket of the base. The graduated square is engraved on the surface of the glass to indicate the width to be cut on the negative, and also circles, the diameters of which are indicated on the gauge. By means of these lines the width to which the negative is to be cut is plainly shown, the transparent table permitting the light to pass through so that the scale can be read through the negative. Two adjustable straightedges are hinged to one side of the table. These extend across the table, and when turned down lie flat upon it. One rule is fixed and the other slides along a graduated scale to measure up to eleven inches. Both rules can be shifted together by moving the bar to which they are attached, until the left-hand rule is carried past the centre of the table. The negative is prevented from slipping by means of rubber cushions let into the table. The machine is handled in this country by Messrs. A. W. Penrose & Co., Ltd.



Estab. Jan. 1894.
"The Process
Photogram."

THE PROCESS
ENGRAVER'S
MONTHLY
THE PROCESS PHOTOGRAM
ESTABLISHED JAN 1894

Vol. XVII. No. 195.
MARCH 1910.

Edited and founded by H. SNOWDEN WARD, F.R.P.S., Founder of *The Photographic Monthly.*

The Paynetype Process.

A Lecture delivered at Bolt Court School by Arthur Payne, F.R.P.S.

(*Continued from page* 44.)

The most interesting feature about the gelatine emulsion is the extremely thin film that is necessary in order to obtain the best result. The film is so thin that it is barely visible when coated upon glass. This property allows the emulsion to be readily exposed and developed right through the film to the back, which effect is an essential feature of the process. It also permits of the film being rapidly washed and dried.

The prepared plates keep well, in fact as long as ordinary gelatine emulsion dry plates will keep under similar conditions. From tests that I have made I find that there is no action from the zinc upon the emulsion after keeping the plates for eleven months, and I think it is reasonable to expect that this trouble does not exist. The plates may be readily cut to any size, before or after exposure, by means of a guillotine machine used in the dark room, which should be illuminated by a yellow light.

Though the process is distinctly easy and well within the power of any photographer of average technical skill, it is at the same time so different in procedure from the older methods of photo-engraving, that it naturally requires a short apprenticeship before the best results can be obtained. I therefore advise the novice in the first place to make several fairly coarse line blocks from good copies, afterwards proceeding to finer line work, and then to coarse half-tone work, either from prints, negatives, or the original subject.

The various steps in the production of a Paynetype block are applicable to both line and half-tone work, either in relief or intaglio, it being understood that for half-tone work the screen is adjusted in the camera in front of the plate in the usual manner.

Exposure.

Presuming that a line copy has been fixed on the easel and focussed in the dark room, a prepared plate of suitable size is taken from the box, and after careful dusting placed in the dark slide.

Though the emulsion is of about the same speed as wet collodion, it is found in practice that the exposures are really less than when collodion is used. This may seem contradictory, but it is really due to the difference in the two processes, and incidentally to the quality of the illuminant. If the "copy" is lit by two 12 ampère enclosed arc lights placed fairly close to the board, the exposure for line work will probably be about seven seconds with *f*/90 stop, whilst mercury vapor lamps require considerably more exposure. As a rule it is advisable to give a full, generous exposure, because the film of emulsion must be exposed right through to the "resist" on the surface of the plate. At the same time care must be taken not to give sufficient exposure to allow the light reflected from the black lines of the "copy" to fog the plate, or there will be trouble at a later stage in the process. The plates possess considerable latitude, though the finer line work requires more care in accurately estimating the exposure, to avoid the trouble caused by the finest lines becoming clogged by irradiation.

DEVELOPMENT.

The exposed plate is developed in a dish in the ordinary manner for 2½ minutes with a glycin developer used at a temperature of from 60° F. to 65° F. This question of temperature is rather important, for with a low temperature the speed of development is very slow, and as it increases in rapidity with a rise in temperature, it naturally follows that a hot developer is preferable for obvious reasons; but it is necessary to remember that if the developer is used at a higher temperature than 75° F. there is a danger of the gelatine film melting. Therefore in practice it is found conducive to success to maintain the developer at an even temperature of 60° F. to 65° F. The easiest and best means for obtaining this result is to be able to control the temperature of the dark room, but this course is not open to all, and the unfortunate ones must make shift with heating the dishes and developer with hot water, or cooling them with ice.

With a little experience the operator will be readily able to judge when development is completed without the necessity for timing the operation, and he will find that with over-exposure development proceeds very rapidly, and must be stopped before the lines commence to veil. In this way he has a sufficient amount of latitude in exposure to make it easy to estimate the correct time, but underexposure is fatal to success, and a cold developer or dishes will also retard development to an enormous extent. It is important to remember that the silver image must be developed right through to the back of the film so as to hold the film to the plate. When development is complete the plate is rinsed under the tap for about half a minute, the extremely thin film of gelatine being thus well washed.

HARDENING.

The rinsed plate is immersed in a 5 per cent. solution of potassium bichromate, which has the well-known effect of hardening the gelatine in the presence of the silver image, and allowed to remain covered with solution for at least three minutes. As soon as the plate is placed in the bichromate solution actinic light may be admitted to the dark room, and though not absolutely necessary, it is an advantage if the bath be occasionally rocked. The same lot of solution may be used to harden three plates, providing that no great length of time supervenes between the different plates, say not more than three hours, but the second plate must be immersed not less than four minutes, and the third plate for five minutes. For similar reasons to those already stated in the paragraph on development, it is necessary that the bichromate solution be used at a temperature of 60° F. to 65° F., but if it is found to be difficult to keep the temperature down to 65° F. it may be an advantage to add a very small quantity of alum, about one grain to each ounce of solution. But I prefer to avoid the use of alum, as it tends to make the whole of the film tough and insoluble, not exercising a selective action, as does the bichromate, and the use of a little too much alum makes the film quite insoluble in hot water.

Hot Water Development.

After the plate has remained in the bichromate solution for the stipulated time, it is rinsed under the tap to wash off the bichromate solution that clings to the surface of the plate, and is then developed in hot water exactly like a carbon print. I prefer to rock the plate in a dish containing water of a temperature of 120° F. to 130° F., until the lines are clear from all traces of white scum which is formed by the silver bromide that is allowed to remain in the film with the object of using it as an indicator at this point of the process. If the bromide had been dissolved out of the film with hypo, not only would it have created an additional and unnecessary operation, but it would also have been extremely difficult to know when the lines had been fully developed. When the plate is developed it is washed under the tap, and if any fine lines are not properly developed, the scum may be removed by delicately tickling it with a pledget of wet cotton-wool used while the plate is wet with cold water.

The plate is then "whirled" to remove the surplus water, heated carefully over a flat bunsen flame or hot plate, and fanned dry, for which purpose a small electric fan will be found most useful. The plate is then carefully examined, and, if satisfactory, is ready for the removal of the resist, otherwise it may be returned to the hot water for further development.

Removing the Resist.

At this stage the plate carries an image in hardened gelatine imposed upon the acid resist, which is easily removed from the portions unprotected by the gelatine film by immersing the plate in methylated spirit 64 o.p., of good quality, rocking the dish several times until the resist appears to be thoroughly attacked by the spirit—usually about five to nine rocks is sufficient—and then rinsing the plate under the tap, when the acid resist is softened and is readily removed by carefully rubbing the plate with a pad of soft cotton-wool.

The whole of this operation is extremely simple, for it is only at one point where the operator is likely to go wrong, and that is when he applies the water to the film with the object of removing the spirit; and there is really no difficulty in this operation, providing it is done in the proper manner. It is helpful to remember that the gelatine film is impervious to spirit, but that it is readily penetrated by water or a mixture of spirit and water, hence it is necessary that the water should be applied to the film in such a manner and volume that the whole of the spirit is washed off the film before the water has time to sufficiently soften the film to allow the spirit to penetrate the gelatine and soften the resist. Probably the ideal method would be to hold the plate vertically under a waterfall, but that is hardly a convenient method to adopt in photographic practice, and what I find to be a good method in practice is to hold the plate nearly vertically in the sink and to apply a full, but not too powerful, stream of cold water to the upper edge of the film so that the full body of water runs down the face of the film and instantly washes off the whole surplus spirit, at the same time gradually removing that small portion which clings persistently to the plate. It is preferable to wash the plate too much rather than too little, and do not forget to wash the spirit from off the back of the plate as well as the film.

When it is judged that the whole of the spirit is removed from the film, the remaining portions of resist may be cleared from the lines by carefully wiping the plate with a loose pad of wet cotton-wool. The plate is then well washed, "whirled," dried by heat as before, and cooled. At this stage it is easy to see if the spirit has penetrated the gelatine film by the matt appearance of the gelatine film—it ought to be glossy. If the spirit has not penetrated the film, it is possible to repeat the immersion of the plate in the spirit, if this be necessary to remove any scum that may be left on the plate, but the operation must not be attempted if the spirit has penetrated the gelatine, as shown by the matt appearance of the film.

REVERSAL BY ELECTRO-DEPOSITION OF METALS.

At this stage the plate is ready for etching as an intaglio or reversed line block, but very probably a relief block will be required, and it is then necessary to reverse the image from a negative to a positive, either by means of the electro-deposition of copper or by what I have called the ink process, which is somewhat similar in principle to the well-known Vandyke process for reversing line work.

It is interesting to note in passing that my first method of reversing the image was to dissolve the developed silver image by means of an acidified permanganate of potash solution, and then to expose the plate to daylight and develop the reversed image. This attractive method is, however, difficult in practice, for the reason that a very slight "veil" of developed silver is obtained at the under side of the film, and consequently is extremely difficult to remove with a reducer. It thus became necessary to substitute a more easy method of reversal, and I hit upon the idea of depositing a thin film of copper by means of electrolysis upon those portions of the zinc plate unprotected by the resist, which in itself prevents the deposition of copper, provided that only a weak current is used. It is really surprising what a thin film of copper forms an efficient resist for a 5 to 10 per cent. nitric acid etching solution, and, for several reasons, a metallic resist has much to commend it to the serious attention of process workers.

The process of electro-deposition is by no means difficult, the principal feature being the necessity for absolute cleanliness of the lines or dots on the zinc. This may be ensured by passing the zinc plate through a graining bath so as to thoroughly remove all dirt, oxide, or "scum" from the lines before the plate is placed in the plating bath; even the grease imparted to the metal by contact with the fingers is fatal to success, as it prevents a good coating of metal being deposited so that the "resist" would break away in etching.

The copper is deposited from a hot solution of copper cyanide, such as is usually used for this purpose, the following being a suitable formula:—

Water - - - - -	80	fluid ounces.
Soda bisulphite - - -	1	ounce.
Pot. cyanide 30 per cent. -	3½	ounces.
Copper acetate - - -	1¼	,,
Ammonia, ·880 - - -	¾	fluid ounce.

The bisulphite and cyanide are separately dissolved in small quantities of the water. The copper acetate is placed in a mortar, rubbed into a thin paste with a little

A

SPECIMEN

PAYNETYPE

BLOCK.

water, and then the cyanide solution is added to this paste. Then add the bisulphite solution to the remaining bulk of water, follow this with the acetate solution, and lastly add the ammonia.

This solution is used at a temperature of about 100° F., for the reason that at this temperature the copper is deposited more rapidly, and also because it is said that cyanide dissolves nearly all the metals in a cold but not in a hot solution.

This solution is used in a suitable electro-plating bath, and I find that a grooved porcelain washing tank makes a convenient utensil to use for plates up to 12 x 10 size, the grooves being useful in separating the anode and cathode.

I find that it is necessary to use a very weak current, say about four ampères at one volt, such as is given by four quart Daniell cells coupled in parallel. Such a current deposits a good coating of copper, without the evolution of gas on the zinc plates, in ten minutes, the plating solution being heated to 100° to 110° F., and one inch separation between the anode and the cathode. Of course it is understood that the anode is kept clean and bright.

The use of a stronger current, such as is obtained from a small accumulator giving 3·5 ampères at 5·4 volts, plates very rapidly but gives off an abundance of gas from the zinc plate and the resist is partially destroyed. This effect is also apparent when the current is reduced to one ampère at 2·7 volts, though the evolution of gas is not so brisk. The copper deposit obtained under these conditions also appears to be granular and porous.

It has been suggested that the copper deposited upon the zinc would form a perfect galvanic couple when the plate was etched in the acid, and that bubbles may be formed at the junction of the two metals, which would prevent the etching of a smooth line owing to the strongest action of the etching fluid taking place at the edges of the film of copper. This may be so if it is considered as a refinement (I am not sufficiently experienced in etching to contradict it, but must content myself with drawing your attention to the blocks that have been etched with a copper resist). Those operators who have used the metallic resist have not commented adversely upon it; in fact, they like it, though they do not like the process of electroplating. Indeed, so strong was the dislike to enter the unknown field of electro-deposition expressed, that I was compelled to devise a third method of reversal, one that was more in keeping with their experience and skill. But before explaining the alternative method of reversal I wish to emphasise the method of metallic resists.

In the first place, it is obvious that a metallic resist is physically much stronger than any other known form of resist, so that it cannot well be destroyed by careless handling. It also withstands heat perfectly, so that there is no danger of the lines spreading and thickening, such as exists by heat causing the waxes used in other processes of line-engraving to melt and run.

And the copper top which remains on the block after it is finished will possibly give an improved printing surface to the plate, and *most certainly does* give an improved finish to the block that will be much appreciated by the customer.

And to anticipate a question. I may say that blocks prepared with a copper resist have been successfully etched in the Levy acid blast machine.

The method of reversal by the ink process will probably be that which will most commend itself to the established process operator. As I have already said, it is somewhat similar in principle to the Vandyke process of reversal for line work, and gives an ink image that is similar to that obtained in the albumen process, over which, however, it possesses the great advantage that there is nothing between the metal and the film of ink.

In order to carry out this process it is first necessary to remove the gelatine film from the surface of the resist by rubbing it with a pad of wet cotton-wool, and it is an advantage if this is done whilst the plate is immersed in hot water. The plate is then dried, warmed, and rolled up with a thin and even coating of litho ink mixed with a small proportion of litho varnish applied with a composition roller. The addition of the litho varnish is necessary to ensure the ink remaining sufficiently tacky to hold the top of the dragon's blood, bitumen or resin, after the plate has been immersed in the methylated spirit. Enough ink must be applied to hold a good coating of dragon's blood or other "top," but it is not advisable to use more than is necessary, otherwise the ink may drag during development.

(*To be continued.*)

Electrotypes versus Originals. Electrotypes versus Stereotypes.

Mr. J. Evans, manager of the stereotyping and electrotyping department of Taylor, Garnett & Evans, Ltd., of Manchester, recently discussed the relative merits of the British system of printing principally from type and original blocks, and of the American system, under which almost everything is electrotyped. Dealing with the advantages and disadvantages to the printer who considers something beyond the working of duplicate sets to save runs on machine, he said:—

"If I were the printer paying the bill I should order stereotypes only for rotary printing, rule formes, and common handbills, because all stereotyping methods, except the Dalziel process, ruin the type from the first moulding. Stereotyping is best for newspapers and short runs of rotary printing, especially when the formes are machine composition. Speed is the chief consideration, and the matter set up is simply thrown back into the melting pot. From rule formes the results are better by stereotyping both for speed and durability, especially in the case of point or 1½ point rules, which are very difficult to electrotype satisfactorily. Stereos can be replaced quickly at machine in case of damage, which often occurs when fine rules are being printed.

"If time is the chief consideration, stereotypes should also be used of half-tone jobs and mixed jobbing formes. Good nickel stereos, from Dalziel or surface-coated flong, give as good a result as electros, but the run is not so great, though a good machine-minder can make a great saving in the life of a plate by under- and overlay. The screen of the half-tones to be reproduced is important. Anything up to 100-line, and in extreme cases up to 120-line, will stereotype, but never beyond, because the greater the number of dots the less the depth in the plate, and very shallow stereotypes soon wear."

Mr. Evans said he "would use electrotypes for everything in a jobbing office except short runs on rotary—rule formes and common handbills—if there was enough work to keep a staff busy. In America stereotyping is not given any consideration in a jobbing office, and this is very wise.

"Suppose we have two formes of 16 up, one of stereotypes and one of electros. One forme costs 16s., the other 32s. In producing the stereotypes the types are made uneven, and whenever they are used again on machine they must be made ready each time to cover the damage done in stereotyping. In electrotyping no damage is done to the type. The surface of an electro is finished by hand, while a stereotype is merely an unfinished casting. The electrotype is by far the more perfect printing surface, lending itself well to make-ready. It lasts considerably longer with better results, and will take and give up the ink better when printing. In the case of mishap during printing an electrotype may be repaired where a stereotype would have to be replaced by a new plate, necessitating new make-ready. A sovereign spent in a good up-to-date electrotyping department will save pounds. Long experience proves beyond question that the greater cost of electrotype has many compensations, the gain being shared by the composing, the machine, and even the binding departments."

ELECTROS OR STEREOS FOR THREE-COLOR.

A member of the audience raised the question of the relative suitability of electrotypes and stereotypes for three-color jobs, and Mr. Evans said that electrotypes were undoubtedly best. Stereos were unsuitable for fine work; and if a forme of mixed electros and stereos were printed in colors, the chemical action of the inks upon the plates would be shown by variations in the finished prints. In stereotyping there was danger of shrinkage, and if this were unequal in the three plates it meant serious deterioration in three-color work. In any case, if stereos were used for this work, no run over 20,000 should be attempted.

The inquirer said that in his three-color printing he could use either electrotypes or stereos, and believed he got the better results from the latter. He always felt diffident about duplicate electrotypes, but with nickel-faced stereos he got most satisfactory results every time.

STEREOS *and* STEREOS.

Mr. Evans said he was glad to hear such warm praise of stereos from a pressroom overseer of wide practical experience. Most pressmen were strongly prejudiced against stereotypes, and he often thought that was the reason why the stereo process had never taken the position of which it was worthy. There were many stereotyping processes, patented or secret, and those who bought them seldom secured results equal to those shown by the exploiters of the processes. Probably this was the result of prejudice, leading to half-heartedness in working the methods. At the head of every electrotyping department there should be a practical man, who would have his own mode of preparation, and obtain excellent results with cheaper production than by buying special made materials. No doubt those who bought the patent flongs would obtain excellent results if they could get a full insight into the manufacture. At the Taylor, Garnett, & Evans works they had a special preparation, but if it was supplied to some other house he doubted whether they could produce such successful plates. The main point was to prepare the surface of the paper so that there was no grain to be seen.

VIGNETTED ELECTROS.

The hard edge on vignettes was usually got away by filing under the plate all round and then slightly bending. Some manufacturers left the vignetting about one inch wider all round the actual picture than was to be printed, and trusted the machine-minder to obtain the desired end inside that margin. Where printers had a stipulated size, as in a page of type and blocks, that system could not be followed.

MOUNTING BLOCKS FOR DUPLICATING.

The best method of fixing blocks in a page of type to be stereotyped or electrotyped was by setting the matter in the ordinary way, spacing with quads cast one pica less than type high, and pinning the illustrations to these quads.

DON'T "RUSH" THE ELECTROTYPER.

Mr. Evans advised those who had the ordering of electrotypes not to rush their work, because the same price had to be paid for plates thinly coated as for those coated thickly, and in a long run the rushed plates would soon begin to show signs of wear. An electro that was only half an hour in the bath could not be as thickly coated as one that remained about three hours.

Patented Tools to Improve Half-tone Reproductions.

Joseph Bell, of Ludgate Hill, London, claims patent for a series of hand-tools to be used in making half-tone blocks. He says:—

"The tools which form the subject of my present invention are intended more especially for use in the improvements in the production of process engraving, process prints, and the like which form the subject of my application for Letters Patent No. 25,968 of 1st December 1908, but they may also be employed for other purposes of a kindred nature. I will describe the use of the tools in connection with the invention described in my before-mentioned application, the object of which is to produce process blocks in relief and intaglio on metal or any other substance, in a more economical, expeditious, and artistic manner than is at present being done by the so-called 'half-tone' screen-negative engraving process and line process. The invention is also to supersede the use of wood in wood-engraving by the substitution of metal plates prepared with an acid-resisting sensitised surface, on which the positive or negative image of the subject to be engraved is printed from an ordinary photographic negative, as it is at present printed on wood for wood-engraving.

"The aforesaid invention obtains extreme contrasts of black and white, the finest artistic gradations of the same, necessary in illustrations designed to be printed with the greatest care, and also is especially applicable to the production of 'blocks' for use in publications in which the lowest grades of paper and printing are used as a matter of commercial necessity and economy. I am enabled to supply those publications with brighter, clearer, and more printable results from 'half-tone' and 'line' process blocks than is possible with the process blocks at present in use, which are not adapted to the paper and ink employed.

"The defects in present blocks are due to the fact that they are not objectively made to compensate for inferior paper and ink, and also that there is no time to 'make ready' a block in the case of daily and weekly newspapers. I seek to remedy these defects, and to produce objectively blocks adapted to the exacting requirements of inferior paper and ink and the limited time available for production.

"Taking the ordinary wood-engraving as a standard gauge of the most desirable form of illustration, the ordinary process block has two radical defects: firstly, it produces no extreme contrasts between whites and blacks; and secondly, its productions lack artistic individuality and quality.

"Various attempts have been made to overcome these defects, and amongst others the services of the wood-engraver were engaged upon the already engraved block to engraving down the dots produced by the screen, thereby obtaining the extremes and gradations of the original picture which it was not possible to obtain by mechanical means in a satisfactory and dependable way. This method of obtaining extremes and artistic gradations is in general use where time and price admit. But this method is much slower, more laborious, and difficult than obtaining the same results in engraving on wood, in which the same tools are used for a similar purpose, but with the great difference that the surface of the close-grained boxwood block has a highly finished plane surface, and is not in broken up relief as in the case of the etched half-tone block. The engraved lines on a block so treated have a set, flat, and formal appearance, leaving, from an artistic and commercial point of view, much to be desired. The re-engraved lines lack the free, varied, and artistic character of the sweep which may be made with a pen, pencil, or brush upon paper, cardboard, or any similar surface, or by the engraver's tool upon the wood-block. Moreover, the cost of a process block 'retouched' by the engraver is often considerably greater than that of a wood-block which, in addition to the extremes of clean, bright, and clear whites, had its complementary solid pure printable blacks, qualities which are absent in the best retouched half-tone. It has been proposed to remove whites from a stone, zinc, or copper plate, and to cut or stop out portions of a screen-negative film, but in my invention I combine the superior qualities of the extreme contrasts and gradations between whites and blacks characteristic of a well-engraved wood-block, with the superior soft half-tone qualities which are characteristic of a well-etched process block.

"The process is divided into two parts: one to obtain pure blacks and the finest gradations of the same; the other to obtain pure whites and the finest gradations of the same. The blacks and their gradations are obtained by drawing or engraving upon the sensitised screen negative before being printed from on to metal, whilst the whites are obtained by drawing upon the resist surface of the plate before being etched, and alternatively by drawing upon the sensitised half-tone negative before being printed. For example, to remedy the dull, ashy appearance in the print from the etched half-tone block of the pure blacks of the original subject or picture, I draw or engrave upon the screen negative with a tool of great artistic precision, used as a pen or pencil is used in drawing, and remove in the form of exquisitely sharp, fine, medium, or broad graduated lines or masses such parts of the screen film—leaving the glass of the negative absolutely bare of any film in such parts as correspond with the pure blacks and graduated blacks, after which the negative is printed on to the metal. The same result can be attained by the use of a tool designed to be used as a wood-engraver uses a wood-engraving tool. The first tool is designed to be used as an artist uses a pen or pencil; the engraver's tool is designed to obtain the same results.

"One feature of the invention consists in obtaining the blacks and whites on the screen negative before it is printed, and another in engraving, or retouching the etching resist surface of the plate.

"An important feature of the invention consists in both the artist and the engraver being equally enabled to work by tool or brush independently of the disposition of the screen dots and lines, allowing both artist and engraver greater scope and freedom. It also follows that much finer screens may be used for blocks produced for printing on inferior paper with inferior ink.

"Whilst there is no known alternative way of producing pure blacks and graduated blacks in process engraving, there is an alternative way of getting pure whites and graduated whites, which forms a part of my invention.

"Before the screen negative is printed I draw upon it with a very fine sable brush with waterproof Indian ink or the like, over those parts of the negative screen film which correspond to the pure whites and graduated whites of the original picture in various qualities of line, or, where requisite, in varied masses small or large, as determined by the original picture, thereby removing by obliteration or stopping-out those parts of the negative-screen film that correspond with the pure whites and graduated whites of the original picture, when the screen negative is printed, the parts so stopped-out printing blank or white, and the surface of the etched plate being in intaglio at those parts which represent the stopped-out parts of the negative.

"The removal of the photographic film and the removal of the etching resist surface is effected by means of the special tools which form the subject of my present invention. They are of two totally different designs for use as an artist uses a pen, pencil, or brush, and for use as an engraver uses an engraver's tool; but both tools differ essentially from the ordinary engraver's tools in that they have no sharp cutting points, their acting edges being objectively designed for use on the sensitised surface of ordinary photographic and screen negatives, and on the resist surface. The acting edges of the tools are formed of suitable curves, to which, when the tool is being used, the surface upon which it is being employed always forms a tangent.

"The tools intended to be employed by the artist are used more or less in the manner of a pencil or brush with strokes towards and away from the operator, and straight or curved lines of graduated thickness may be readily produced in an artistic manner. Such a tool is preferably so shaped at its working end that the curved acting edge thereof is below the central line of the stem of the tool when in use. In a tool of this description two or more acting edges may be provided of the same or varying curvatures in one tool, and the tool may be double-bevelled and hollow-ground.

"In the case of the engraver's tool the curved acting edges may be formed at the end of the tool and at right angles to the direction of movement of the tool. Such a tool is preferably so shaped at its working end that the curved acting edge is above the centre line of the stem of the tool when in use.

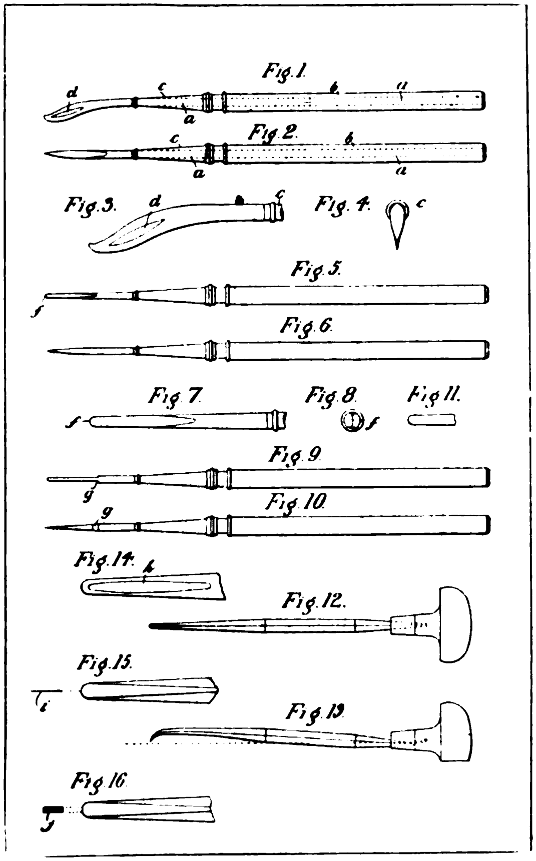
"By my invention the more or less mechanical production of process engravings and process prints as heretofore practised is capable of vast improvement, by the introduction of artistic manipulation in a relatively economical, expeditious, and easy manner.

"In the accompanying drawings are illustrated various forms of tools, although I do not wish to limit myself to the use of tools of the precise forms shown.

"Fig. 1 illustrates a side view of an artist's tool intended for use, for example, in forming horizontal or inclined lines in the process of removing the sensitised surface of an ordinary photographic negative, a half-tone screen negative, or the etching resist surface of the metal or other plate which is to be afterwards etched. Fig. 2 is a plan view of fig. 1. Fig. 3 is an enlarged side view of the working end of the same tool. Fig. 4 is an end view of fig. 3.

"The acting edge of this tool is so curved as to enable graduated or other lines to be formed. A graduated line may be formed by slightly rotating the tool during the formation of such line in a similar manner to that in which an artist rotates his pen or pencil. Or such gradations may be effected by varying the angle at which the acting edge of the tool makes contact with the surface being acted upon, the outer end of the curve or volute being designed to form lines of the finest gradations, while thicker or broader graduated lines may be formed by bringing the flatter portions of such curve or volute into contact with the surface being acted upon.

"The stem of the tool may be made in any suitable or convenient manner. For example, the steel stem *a* may be circular in section and may be covered with wood or other material *b* of hexagonal, round, or other convenient shape, and may be furnished with a brass or other metal ferrule at *c* as shown. The curved acting edge of the tool is arranged below the centre line of the stem thereof, and the working end of the tool is preferably hollow ground as shown at *d*. In cases where it is required to remove ungraduated masses or uniform thick lines, the acting edge of the tool may be provided with a flat edge of the necessary length for this purpose. And three or four separate acting edges with flats of varying lengths may be arranged on the head of one tool.



"Fig. 5 is a plan view of an artist's tool intended for use in producing perpendicular lines on the beforementioned surfaces. Fig. 6 is a side view of fig. 5; fig. 7 an enlarged plan view of the head of fig. 5; and fig. 8 an enlarged end view of fig. 7. The acting edge *f* of this tool is shown of semicircular shape, but it may be of any other convenient curved shape. Fig. 9 is a plan view of a ruling tool intended for use in combination with a ruling edge for producing lines upon the surface hereinbefore referred to. Fig. 10 is a side view of fig. 9; and fig. 11 is an enlarged plan view of the working end of fig. 9. This tool has a curved acting edge as in the case of fig. 5, and is provided with a square shoulder *g* to engage with the upper edge of the ruler and ensure that the acting edge shall always remain parallel with the said ruler when in use. Fig. 12 is a plan view of a tool to be used in carrying out my invention in the same manner as an ordinary engraver's tool. Fig. 13 is a side view. Fig. 14 is an enlarged under side view of the end portion of figs. 12 and 13, showing the hollow grinding at *h*. Fig. 15 is an enlarged view of the head of fig. 12, showing the line *i* which it will produce; and fig. 16 is a similar view to fig. 15, but illustrating the working end cut away so that the acting edge will form a thick line as shown at *j*.

"It will be understood that lines of various definite thicknesses may be produced by employing similar tools, the curved edges of which are cut away so as to form flat acting edges corresponding to the thickness of the line required to be produced. Or similar tools having curved acting edges of any suitable radii may be employed for the same purpose according to the thickness of line required.

"An essential point of difference between the tool last above described and an engraver's tool as at present in use is that in the latter the graving point is situated below the central line of the stem of the tool, whereas in my tool the curved or flat acting edge is situated above the said line as shown in fig. 13."

Marking Copy for Reduction.

FRED J. WILLOCK, writing in *Photo-Engraving Art*, deals with the marking of copy for reduction, by precept and example. He says:—Many inexcusable errors are made by engravers' photographers when copies are marked with percentage reductions, such as "⅓ off," or "¼ reduction," or "⅔ size," "one col.," "two cols.," etc. In a majority of cases the operator misconstrues the marking, and when a copy is marked "⅓ off," the customer will be chagrined to receive a cut one-third the size. Many customers, who under ordinary circumstances display average intelligence when dealing with engravers, do not seem to realise that the "one column" might mean anything from "1⅝" to "5" or more. They seem to forget that the engraver has many customers who are publishing periodicals and that the widths of the columns of the different publications are as varied as the whims of the publishers will allow.

In the writer's opinion there is only one proper way to mark a copy, and that is to designate as plainly as possible the actual inches, width or height, and the amount to be included in the dimensions marked. If a copy is to come within a certain proportion it should be so marked. When a copy is marked as fig. 2, the usual procedure is to bring it "within" if the

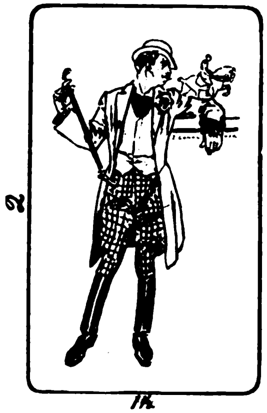


FIG. 2.

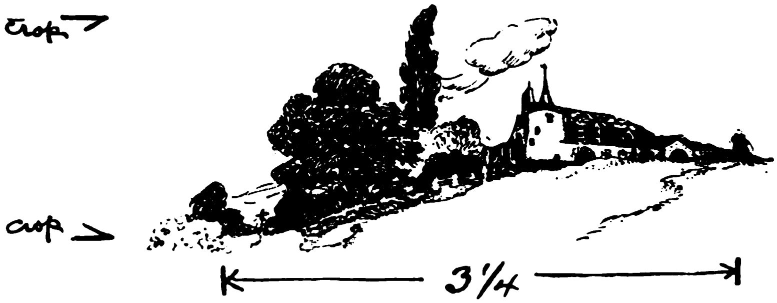


FIG. 1.

proportions do not allow of the reduction. An example will illustrate: a photo 8 × 10 is marked to be reduced to 3½ × 5. Reducing the height to 5 inches will make the width 4 inches.

The photographer following instructions will reduce the width to 3½ inches, and ignore the height marking entirely. The result is that the proportions will be "within" the specified size and will come 3½ × 4⅜ inches. If, on the contrary, the customer had marked his copy 3½ × 5 and had added "crop to fit," the photographer would have taken the full height, or 5 inches, and cut enough off each side to make the proper width. No photographer will take the liberty to crop a picture unless he has had instructions to do so, and if both height and width are indicated, unless the copy is in proportion, the "within" rule holds good.

Often a customer will send an original photograph or drawing and a sample, with instructions to "make a cut same size as sample," and as often the sample is lost or misplaced and the cut is delivered the "same size." It is easy to imagine the customer's feeling if the copy is 8 × 10 inches, and the cut desired 2 × 2½ inches. Marking the copy 2 inches wide would have saved time and money for the engraver and customer.

Fig. 3 shows a common form of marking copy, which is often the cause of considerable trouble, as it leaves the desired size in doubt. The proper way to mark it would be as is shown in figs. 1 and 4. In

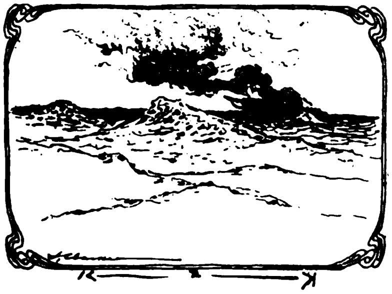


FIG. 3.

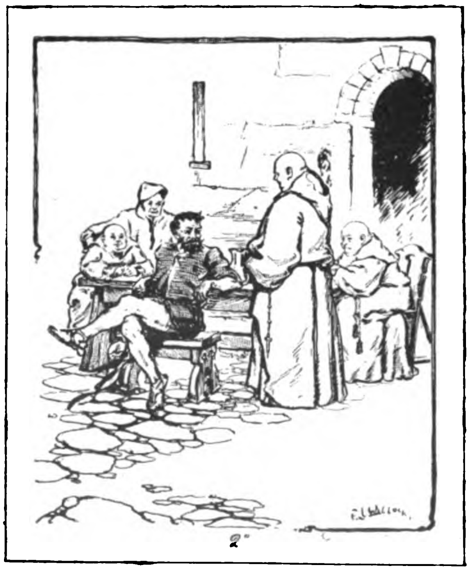


FIG. 4.

fig. 1 it will be seen that the crop marks indicate the exact portion intended to be included in the measurement; they are decisive, and leave no room for doubt in the mind of the photographer. If a copy is marked as fig. 4 the operator measures on the extreme width of the drawing, not on the margin of the paper. The whole of the picture is included in the reduction or enlargement.

The Aerograph in Process and Lithographic Work.

A Lecture delivered by Mr. Chas. Burdick at the Bolt Court School.

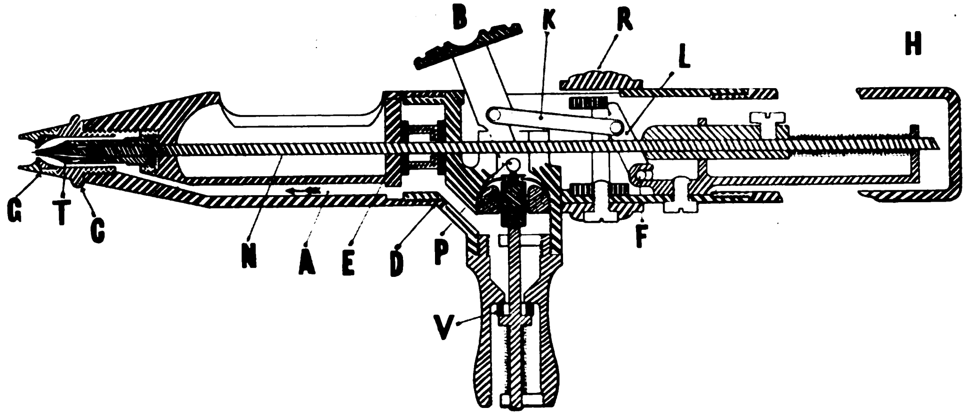
I AM a firm believer in the force of practical demonstration and the insufficiency of words where technical matters are concerned. I shall therefore make my verbal explanations short and give you the best practical demonstrations of which I am capable.

First, I should like to say that I shall confine my paper to explanations of the Aerograph and its methods of operation rather than to the details of working up pictures for process or the artistic side of its application.

There are now many expert workers with the Aerograph, and many teachers, like Mr. Brookman for one, who are more capable than I am to give instruction in their respective departments. But my long experience in the manufacture of spraying apparatus is perhaps unique, and I believe it is the part of wisdom to talk about that which you know.

The Aerograph which I am showing you to-night, and with which I hope to give you some practical demonstrations, is the result of seventeen years' labor, confined almost exclusively to one line of work, and my reason for giving you a detailed description of the working parts is that those who use the machine may better understand the broad principles of its construction which have made it a practical artists' tool. It is possible to make a spray for 5s., and we could manufacture spraying apparatus at any price from 5s. to five guineas, and the value of the article would be fairly represented in the price. From the first we have spared no pains to make the instrument as perfect as possible. We have used platinum or gold in the more delicate part of the instrument, the little tip through which the color comes, marked "T" on our diagram. This tip must not only be non-corrosive, but must be very strong, and we have found platinum better than gold, as it is tougher. Anyone who has had an Aerograph that has been in use for some years—and some of these instruments have been in use twelve or fourteen years and are still good—will discover on rubbing this little point that the metal is to all practical purposes as bright as when they purchased the instrument. It is very extraordinary that a metal submitted so long to liquids and mixtures of paint should not become corroded.

The point of this platinum tip is made square to produce suction on the color. Some people suppose that the color flows through the point by force of gravity, but the result would be very poor if this was depended on alone. The suction on some of the larger models of Aerographs is sufficient to support a six-foot column of water.



After much experiment we have adopted $\frac{7}{1000}$ of an inch as the diameter of the hole in this tip at its point. With a larger hole the instrument is not capable of so nice work, and with a smaller hole the danger of choking with dirt particles becomes increasingly greater.

This hole in the tip is tapered 4°. This taper is also the result of long practical experiment.

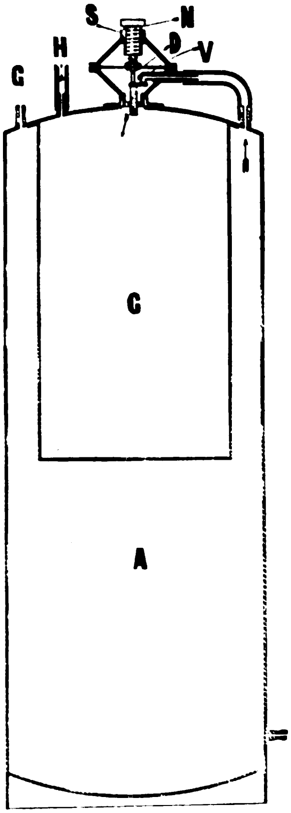
The needle which fills the aperture through which the color comes is made of German silver; this does corrode slightly, but unless acids are used it never amounts to more than discoloration. It is of vital importance that the point of this needle should fit the platinum tip perfectly. If the angle of the needle did not correspond exactly with the angle of the tip, we should either burst the tip or allow room for color round the point of the needle, which would cause a spitting. I speak of this because sometimes artists get their needle bent and then sharpen it at another angle, thereby damaging other parts.

I wish to refer now to the regulator for setting the line which is controlled by the band R. The little cam attached to this band prevents or limits the forward movement of the needle so that the needle can be prevented from shutting off entirely the flow of color. This is very important if anyone wishes to do fine lines or very delicate shading. If the needle shut the color off entirely and one depended on pulling the button back to produce a fine line, it would require great skill to secure any considerable degree of accuracy. The button B attached to the lever, which operates the air valve, is disconnected from acting directly on the needle to increase the flow of color, but is connected to a second lever "L" by a link "K." By this means we secure a free up-and-down movement to the finger lever and a more delicate adjustment of the air valve than would be possible in a single lever which performed both operations. It is the lever L which directly controls the amount of color and has a fulcrum at "F."

While on this point, at the risk of showing our competitors how to make sprays, I wish to point out that this simple construction is so arranged that the increase of the flow of color is but slow at first and increases more rapidly as the lever is brought further back; in other words, the short arm of the lever is near the fulcrum at the beginning of the action and at the other end for the later part of the movement. This construction secures that in the more delicate lines and shading a longer movement of the button is required, making the instrument more easy of control. Where larger quantities of color are employed it is not necessary to have such a nice adjustment; the lever therefore acts more rapidly.

We have provided a detachable front portion to the hand-piece which enables us to get at the point of the needle for cleaning. As a matter of fact, the point of a needle rarely requires cleaning. If color or dirt lodges in the inner parts of the instrument it is almost invariably on the inner walls of the tip or front portion of the receptacle. This detachable head can be easily cleaned through the hole in the back, an advantage which no other construction of air brush permits. To secure that no color shall get into the working parts we put a double backing at "E" with a small chamber which must become filled with color before the color can get into the working parts. As a matter of fact, this is an accident which occurs very rarely unless one is very careless and puts it in around the finger lever. The nipple to which the rubber tube attaches is detachable from the main portion of the instrument, and the valve is so constructed that the air is maintained in the chamber when the hand-piece is removed.

And now a few words as to the general care of the instrument. We find that, although the parts are detachable and easily taken apart, it is a rule almost invariable that those who pull their Aerographs apart the least obtain the most satisfactory work with them. Usually all that is required is to secure a high air-pressure, put the finger over the nozzle and blow the air back through the color receptacle, alternating this movement with blowing the color through with the needle well drawn back. The front end of the instrument may be immersed in hot water and this blown through to clean any serious obstruction. If, however, gritty particles have gone into the instrument it is better to return the hand-piece to the manufacturers and have them remove it by expert labor, as there is danger of damaging the small platinum tip. I shall be able to do some drawing with this instrument, both in black and white and colors, but before doing so I will complete my description of our lithographic apparatus for obtaining different textures.



By reference to the drawing, "A" is a large air chamber into which air is forced through a passage at the bottom until the pressure is at the highest point[1] conveniently obtained. Inside of this air chamber and suspended from the top is a smaller air chamber "C." The air passes from the larger chamber into the smaller one through the valve at "P." This valve is controlled by spring "S" and a diaphragm "D," and is so arranged that when the air-pressure in the smaller chamber reaches a certain point it shuts off a further flow from the larger exterior chamber by adjusting the tension of the spring which operates directly against the diaphragm. This can be set for any pressure from 4 lbs. up to the maximum contained in the larger reservoir. Two air gauges are supplied which give the pressure in the respective air chambers, and the operator draws his air from the inner chamber. In the early days when the air brush was first introduced for lithographic work artists were able, by controlling the amount of air in the pump, to regulate to some degree the texture of the spray, but the method was so uncertain that very indifferent results were obtained. Sometimes the artist relied on an instrument which was working badly, that is, not giving a fine spray, but this method is unsatisfactory from two points of view: first, that a machine which works coarse cannot be relied on to work at all times with the same degree of coarseness; and secondly, that with a higher pressure there may be many coarse specks, but some of the color will be broken up fine, and there is a mixture of coarse and fine which to the casual observer looks like coarse when the work is not homogeneous. By this air regulator we are able to secure a definite texture and return to it with absolute certainty by simply setting the valve.

Composite Pictures, Cheque-patterns, etc., by Photography through Ruled Screens.

Adolf Brandweiner, of Stuttgart, claims a patent for "a method of and means for composing photographic negatives of composite pictures by means of a plurality of ruled screens in conjunction with pivoted carriers connected with a photographic camera. Heretofore photographic designs have been obtained by gradually shifting transparent copies of the separate components of the design by means of a precision device and then reproducing these in successive portions on a stationary sensitised plate by repeated exposures and readjustments. For very complicated designs it has been necessary to prepare in this manner intermediate photographic pictures which subsequently had to be rearranged part by part and then finally again photographed to provide a complete original for the engraver of cheques and bank notes. These repeated photographings render the lines indistinct and unfit for use in high-class work.

"I provide a ruled frame suitably numbered, upon which the designs are shaped together, cut and composed by hand from divers separate photographic or other transparent pictures. These prepared transparent pattern pictures are then trimmed and removed and carefully placed in the same order upon a movable carrier connected with the front of a photographic camera and fitted with a transparent screen ruled in the same manner as the aforementioned hand frame, so that the individual parts of the picture may be readily disposed in an accurate upright position and in the exact order as previously composed. These ruled screens are only used for composing and for adjusting the parts of pictures in the photographic apparatus. I also provide means for adjusting the transparent pattern picture at an angle in front of the lens to enable distorted or shadow pictures to be produced. The aforesaid means consist especially of two compound pivoted carriers connected with the photographic apparatus so as to receive the original picture and turn and move or adjust the same in any desired direction, each carrier being provided or supplemented with a hinged ruled screen for the purpose previously mentioned.

"I am aware that it has been previously proposed to fit a photographic apparatus of a similar kind with a rotary and endwise moving carrier as well as with a perforated or ruled screen or stencil.

"The accompanying drawings show my improved apparatus.

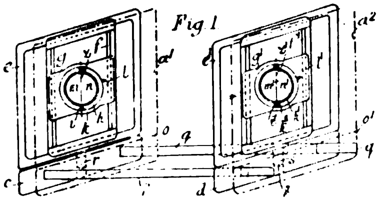


Fig 1

"Fig. 1 is a perspective view of the photographic apparatus with two adjustifiable carriers and two hinged ruled screens. Fig. 2 is a perspective view of the composing frame. Fig. 3 is a longitudinal section of the apparatus, showing more fully the camera and arrangements of parts.

"For my purpose I require three similarly ruled screens a a^1 and a^2. The screen a serves for composing by hand. The screen a^1 is placed in front of the lens, while the screen a^2 is placed within the apparatus near the plate-carrier.

"These screens consist advantageously of transparent plates ruled with cross-lines and numbered along the edges. The plate a is mounted upon a frame or stand b on four feet so as to serve in composing pictures by hand. The screens or plates a^1, a^2 are correspondingly ruled and numbered, and they are hinged at o, o^1 so as to turn down when desired.

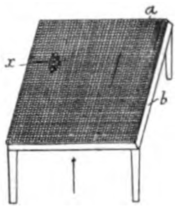
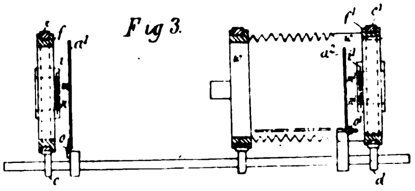


Fig 2

"The photographic apparatus comprises two rails p and q, on which are mounted the slidable base block c for the pattern picture carrier and slidable base block d for the sensitised plate-carrier.

"The pattern picture carrier consists of a disc m n mounted so as to turn in a ring h on an axis z by virtue of pivots i retained in bearings k. The ring h is capable of turning in a sliding holder g, which can move up and down in a frame f, the latter being slidable towards the right and left in a frame e.



"The sensitised plate carrier within and forming the rear portion of the camera is constructed in like manner, of a disc m^1 n^1 which turns in a ring h^1 on an axis z^1

by means of pivots i^1 retained in bearings k^1, said ring turning in a sliding holder g^1 vertically movable in a frame f^1, which latter slides latterly in a frame e^1.

"The pattern picture-carrier is mounted in its base block c by means of a pivot r, while the sensitised plate-carrier is mounted in its base block d by means of pivot s. A handle and pointer l or l^1 serves to adjust the carrier ring h or h^1 in its holder g or g^1.

"The operation is as follows:—

"For composing a complete transparent pattern picture, the separate originals are placed upon the ruled screen a (fig. 2) and adjusted side by side or partly one over another as may be necessary. Overlapping edges are then cut off so that the remaining portions adjoin each other accurately and form the required pattern.

"This is then placed on the disc m n of the picture-carrier and adjusted carefully by looking through the transparent screen a^1, which should be placed as near as possible to the picture-carrier, and turning and displacing the latter up, down or sidewise until the adjustment is perfect. The adjustment can be readily carried out in a dark room with a light placed close to the back of the picture. After the completion of this adjustment, the screen a^1 is turned down on its hinge o. A pattern picture thus produced may form a complete picture in itself, or it may serve as a repeat portion for the final picture to be completed in the photographic camera.

"The screen a^2 within the camera serves for making any final adjustment of the carrier m^1, n^1, for determining the position of the image on the plate; and also, for repeat patterns, for determining the successive positions into which the carrier will be moved in making successive exposures.

"If the pattern picture serves as a repeat for the final photographic picture, the carrier m^1 n^1 is repeatedly moved into the various positions for the correct adjoining of the repeat, the various positions being carefully marked. The screen a^2 is now turned down and the sensitised plate is inserted in place of the focussing plate, whereupon an exposure can be effected for obtaining a negative in the usual manner."

Music as an aid to Color-harmonies.

According to Hardesty G. Maratta, writing in *Photo-Engraving Art*, anyone who knows enough music to be able to strike a harmonious chord can compose harmonious color-schemes. This may be useful to the designer of catalogue-covers and other commercial stationery in which color is used.

The three diagrams and the notes which we extract from Mr. Maratta's articles will be sufficient suggestion for most of our readers.

Diagram No. 1 shows the keyboard of a piano with music symbols; the letters

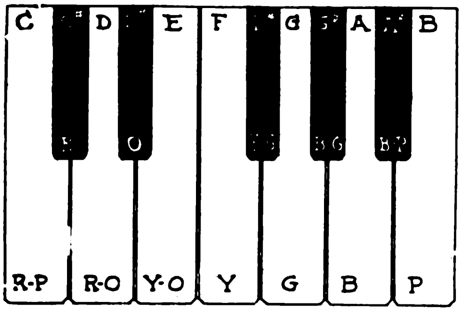


Diagram 1.

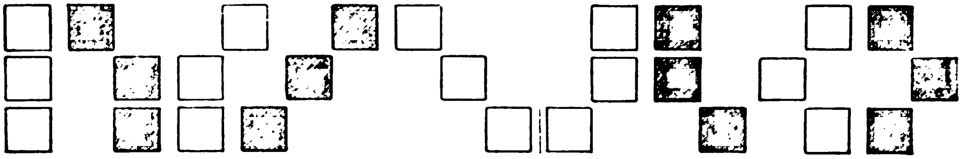


Diagram II.

represent the colors of the chromatic scale of pigments.

Any chord or triad selected from the music scales will also be a chord or triad in colors.

Those not understanding music will find diagrams No. 2 and No. 3 of great assistance in selecting both music and color chords.

Many musicians can produce a chord on an instrument, yet are unable to tell why it is a chord. We cannot compare the artist with this musician. The artist may produce many agreeable color-harmonies by so-called feeling, which is really accumulated knowledge. While the musician has a scientifically tuned instrument, the artist must adjust or tune his instrument each time he uses same, by mixing on the palette not according to any law, but entirely by his eye and past experience. He knows that cobalt blue and yellow ochre make a distant gray-green, or cobalt and light red make an agreeable distant purple, etc. These formulæ the artist accumulates by experience, and they are limited.

C RED-P.	C# RED	D RED-O.	D# ORANGE	E YELL-O	F YELLOW	F# YELL-GR.	G GREEN	G# BLUE-GR.	A BLUE	A# B-PURP.	B PURPLE
E YELL-OR.	F YELLOW	F# YELL-GR.	G GREEN	G# BLUE-GR.	A BLUE	A# BLUE-P.	B PURPLE	C RED-P.	C# RED	D RED-O.	D# ORANGE
G GREEN	G# BLUE-GR.	A BLUE	A# BLUE-P.	B PURPLE	C RED-P.	C# RED	D RED-OR.	D# ORANGE	E YELL-OR.	F YELLOW	F# YELL-GR.

Diagram III.

* Copyright, 1909, by H. G. Maratta, N.Y.

Bolt Court School—A course of five lectures on "Three-Color and Orthochromatic Work" will be given by Mr. A. J. Bull on Tuesdays, March 8th, 15th and 22nd, and April 5th, and 12th at 7.30 p.m. Students of the school free; non-students 2s. 6d.

AN INTAGLIO PROCESS for making photogravure plates and for machine printing therefrom is offered for sale "to a few responsible firms throughout the United States" by the Photogravure Company of North America, Ltd., 123-125 North 5th Street, Philadelphia, Pa.

THE CURRENT "PROOF" from the Gould Press, 1324 Washington Avenue, St. Louis, contains some excellent funning and some interesting facts anent the Cook-Peary-Pole controversy. But it is not illustrated. The Gould Press may do the finest printing in the world, but it will never be so effective as it ought to be until it uses, preaches, and pushes ample illustration.

"IF POSSIBLE, SAMPLES OF THE PAPER to be used should be submitted when asking for an estimate for cuts." This recommendation comes from a Gatchel & Manning advertisement, and is well worth considering. While 95 per cent. or perhaps 99 per cent. of customers for half-tones know what screen is desirable for their particular work, the 5 per cent. or the 1 per cent. may get into trouble through not realising the necessity for adjusting the block to the paper.

Specimens and so forth.

The Vincit Company, Limited, of 67 Aldersgate Street, have a well-gotten-up catalogue of the many carborundum grinding wheels that they supply. It will be sent free to all applicants.

Gebr. Delgeur & Co. of Rotterdam send us specimens of the monthly card calendars that they are issuing. They contain very fine examples of half-tone work, and should be the means of bringing business if they are wisely distributed.

Catalogues for Tailors and Clothiers are a line with the Bishop Press, Kansas City, Mo., which obtains some very good effects by means of half-tones of suits, printed over flat tints that go under the garments, leaving the background and surroundings in the plain half-tone.

From Vaus & Crampton, Ltd., comes a capital sample-book, full of good points, from the telegraphic address "cameralist" and the excellent view of their premises at 31 and 32 Kirby Street, London, E.C., to the colophon on the back cover. Examples are given of tricolor, machine-catalogue work, full-gradation, half-tone, machine-etched line-work, and newspaper half-tone. The five specimens may be tersely described as being emphatically "fit, though few."

Catalogues by Photo-reduction and Offset-printing.—An American user of the Offset press recently printed a large catalogue full of illustrations, the pages being 12 x 8 inches. He had an order to duplicate the catalogue in pages 6 x 4, and instead of re-setting it and having new cuts made, he had the pages photographed in the proper size directly on the zinc plate, sixteen pages on each plate, properly imposed, and worked it on his Offset press. He saved about half the cost of any other process.

Offset Transfers from Half-tones.—The rubber sheet which is used for printing in the "Offset" press is coming into general use for transferring. *The National Lithographer* says:—"In re-transferring from half-tones, etc., very few transferrers now use the 'paper to paper' process. The up-to-date transferer uses a piece of rubber blanket for his first impression and pulls his re-transfer from that. This minimises the danger of 'squashing,' which is so likely to occur when the 'paper to paper' system is used. It is no uncommon thing for a transferer by this rubber blanket process to pull and lay down a dozen fine re-transfers without spoiling one. The Potter Press Company makes a re-transfer machine which works on this principle very successfully."

"Great on Stunts" is the laconic description given by a friendly competitor of the Gatchel & Manning Company. "Stunts," as some of our home readers may not know, are those tasks and tests which one boy sets another, hoping that he will not have the courage to tackle them. The Gatchel & Manning Company, though they undertake all the regular lines in engraving, are noted for, and are particularly proud of, their specialisations on new lines that seem promising, or older lines that give special results as the outcome of special care and skill. Thus, they have gone thoroughly into the photo-mechanical side of offset printing, and specialise on this new field. They have recently been specimening some extremely fine half-tones, printed from the offset press, on a medium rough unfaced paper, and also on a paper with heavy imitation crocodile-leather surface. Such pioneer work is not only good for Gatchel & Manning, but is helpful to the whole trade. It means expansion.

It is pointed out that amongst the best advertisers (especially in the United States, where magazines have been developed more than in England) there is a tendency to increasing use of magazine pages, with the corresponding decrease in the use of newspapers. This is attributed largely to the fact that magazines are so much better printed, and that advertisers are more and more inclined to rely upon advertisements illustrated with fine blocks, which cannot be handled effectively by the newspapers. Some of the greatest daily journals are realising this fact, and are doing all that they possibly can to improve their printing, in many cases by having an inset picture sheet or sheets printed on special machines with special ink and on special paper in addition to their news sections, which are run at greater speed, and the formes for which have to be kept open until the last moment. This effort means a great deal for process men, and our readers should encourage the improvement of printing methods whenever they are able to influence it.

Publications.

"Dry Plates for Process Work."—Such is the title of a booklet issued by the Ilford Company. This well-known firm has been such a pioneer in the introduction of dry plates for process work, that it is not surprising that they should also supply much helpful matter to aid the process worker who changes from collodion to dry plates. It is full of practical matter for working, and contains various developing formulæ as well as instructions for orthochromatising Ilford half-tone plates, making a very valuable booklet to all three-color workers. Besides the text matter, specimen pages of illustrations are given of half-tone and line blocks that have been made on the Ilford products. Any reader mentioning *The Process Monthly* and applying to Ilford, Limited, London, E., will receive a copy post free.

Business.

The Intaglio Printing Company has been incorporated at Rutherford, N.J.

The Yosenite Engraving Company, Berkely, California, has been bought by Victor S. Schott.

A new process house in St. Louis, Mo., is the Art Printing and Engraving Company, capital $10,000 (£2000).

In Melrose, Mass., the Morse Engraving Company, capital $6000 (£1200) has been incorporated by Virgil A. Charles, Robert S. Preble, and Fred A. Putman.

The Pike's Peak Cut and Engraving Company's business has been sold to Louis P. Hess, J. L. Jones, and T. J. Lally, who are increasing the plant considerably.

The growth and activity of "Process" in America are indicated by the large number of new concerns incorporated each year. We report several in almost every issue.

In Syracuse, N.Y., the Car-Van Engraving Company has been incorporated with a capital of $6000 (£1200) by Charles J. Carroll, William S. Farmer, and Clayton M. Van Zandt.

The closing of a newspaper shop has been effected by the purchase of the process department of *The Birmingham News* by the Alabama Engraving Company, Birminghim, Ala.

The American Colortype Company has purchased property on Racine Avenue, Chicago, where it proposes to erect building and equipment costing in all some half-million dollars (£100,000).

In Kansas City a new concern, The Parkers-Chambers Engraving Company, has been started with a capital of $10,000 (£2000). Incorporators:—George D. Chambers, J. W. Parker, L. E. Pfaat, and others.

The Whole-Tone Engraving Company of New York has been incorporated by H. L. Coffin and E. J. and S. M. Gardenhire, with a capital of $100,000 (£20,000) to work the process of Dr. Müller-Jacobs. The company will produce relief-printing plates without the use of the half-tone screen.

The Apollo Manufacturing Company has been incorporated at Reading, Pa., with a capital of $100,000 (£20,000) to undertake engraving, electrotyping, bookbinding, and color-printing of advertising novelties. The officers are:—President, Paul K. Leinback; vice-president and general manager, Max Langer; treasurer, J. H. Renninger; and secretary, E. R. Garber, all of whom are well known in the trade.

Brevities.

The Turin Exhibition 1911 will deal with all that goes to the making and the use of paper, and should have a photo-engraving section of very great international interest.

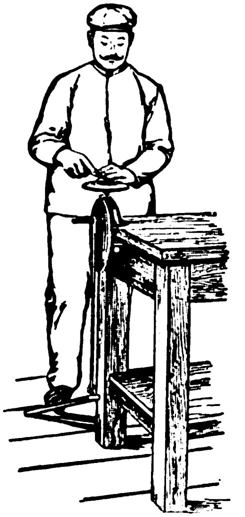
This magazine and all the publications of Dawbarn & Ward, Ltd., will in future have the advantage of the much wider distributing services of the old-established publishing house of George Routledge & Sons, Ltd., 68–74 Carter Lane, London, E.C.

"Foam" is the name given to a fluid for general use in the perchloride of iron etching solution. It has been put on the market by Mawson & Swan, Limited. By the addition of a quarter ounce of this fluid to the etching bath a quantity of foam is produced that materially assists in the etching of the copper plate.

The I.A.P.E. Conference is to be held in Buffalo, early in June. The decision was reached at a meeting in New York, when H. C. C. Stiles (president) and representatives from Philadelphia, Chicago, Cincinnati, Cleveland, Detroit, Buffalo, and Toronto were present, as well as many of the local men.

Kleankut, a preparation for cleaning half-tones from printing-ink, varnish, etc., whether fresh or old and dried, is primarily intended for printers, but should prove useful for engravers too. It is guaranteed not to injure the metal of the cuts, nor the fish-glue resist, when that is left upon fine half-tones; and it is put upon the market by the Ault & Wiborg Company.

Hunters, Limited, have just introduced a very handy tool for process workers, which is known as the High Speed Tool Grinding Machine. It is conveniently arranged for fitting on to the bench, and can be either worked by hand or treadle. A few revolutions of the hand wheel causes an emery wheel to revolve at a very great speed, and should be of great help in providing a sharp edge to the many tools used in process work. It is supplied at the moderate charge of 28s. 6d.



"Men make a beaten track to the door of him who makes a better product than his neighbors." This little sentiment, adapted from an advertisement of the Kitab Engraving Company, is an excellent advertising motto for any firm whose goods bear out the implied boast.

The Arthur Cox Illustrating Company have installed a Millar saw and trimmer at their works, and report:—"After submitting the Millar saw and trimmer to exhaustive tests, we are pleased to say it has proved itself to be just the tool we have been seeking. It fulfils all your claims as regards accuracy and universal utility, and we find it indispensable for the various out-of-the-way jobs that are continually cropping up in a mounting room. It certainly is a big step in front of any other squaring machine we know of, for the accurate handling of big numbers of small or medium-sized blocks."

Hospitality in Philadelphia.—When in Philadelphia recently, the editor of this Journal was entertained to dinner by Mr. Elias Goldensky and a few of the leading professional photographers of the city; to luncheon by Mr. J. G. Scorer, to meet a few lecturers, and secretaries of lecture-organisations; and to luncheon by Mr. Louis E. Levy, to meet a few of the photo-engravers. In each case there was only a few hours' notice, so that the companies were small. Mr. Levy's party, at the City Club, included Messrs. Louis and Joseph Levy, of the Graphic Arts Company (the acid-blast etching machine), Mr. Max Levy, of screen-ruling fame, Mr. Beck (Beck Engraving Company), Mr. Gatchel (Gatchel & Manning), Mr. Rubin (Colortype Company), and Mr. H. C. C. Stiles, of Washington, D.C.

"No 'clock-watchers' need apply" is being used in advertisements, as if this race of men was particularly objectionable to the employer, but in the current *British Printer* a correspondent turns the tables, and says that "clock-watchers" are made by inconsiderate employers, who give no meed of praise to the good man, and therefore keep him in a state of uncertainty as to the permanency of his position, and, it may be, the prospects of his wife and family. This writer says: "I used to do my level best, and I know that some things I have done have earned good money for my employer, but he never said even 'thank you.' Consequently I get away as soon as possible, do as little as I can, because the less I do the smaller chance there is of being blamed for a mistake. I am a 'clock-watcher,' not from idleness, but because with such an employer it is the best policy."

Estab. Jan. 1894.
"The Process
Photogram."

THE PROCESS
ENGRAVER'S
MONTHLY

VOL. XVII. No. 196.
APRIL 1910.

Edited and founded by H. SNOWDEN WARD, F.R.P.S., Founder of *The Photographic Monthly*.

The Paynetype Process.

A Lecture delivered at Bolt Court School by Arthur Payne, F.R.P.S.

(*Concluded from page* 54.)

AFTER the plate has been well rolled up with ink it is immersed in methylated spirit for two or three minutes, which softens the resist under the ink, and then, by gently brushing the film with a pledget of wet cotton-wool whilst the plate is immersed in the spirit, the resist is removed, leaving the positive image in ink upon the metal plate. The plate is then rinsed under the tap, dried, retouched and given a "top," when it is ready for etching in the usual manner.

The methods to employ in etching the plates are really outside the scope of my paper, because each operator may use that process which he prefers. But perhaps I may be permitted to state my views on this operation. Taking the last method I described, first. It is, of course, obvious that plates reversed by the ink process may be etched either by the rolling-up process or with dragon's blood. Personally I prefer to use the latter and give the plate *two* tops with blood before the first etch; that is to say, I charge the ink with blood in the usual way and then heat the plate until the blood first melts. After allowing the plate to partially cool, but not to become quite cool, I again brush dragon's blood over the plate until the ink has taken up all the blood it will carry. Again heat the plate until the blood melts and then proceed with the first etch. This is a method of working which gives a good strong "top" that will be appreciated by etchers, and, of course, the remaining operations are those customary when working the dragon's blood process.

Plates reversed by the electro-decomposition of copper must be etched by the dragon's blood process, although it might be possible to use an adaptation of the "rolling up" process, if Pigg's method of rolling-up the plate with letterpress ink before etching was adopted, in which, you remember, the acid penetrates the ink which comes away with the dissolved zinc, but the ink is not affected where it lies upon the top of the resist. Having thus obtained a greasy image, the plate could be gummed and rolled up as usual.

Intaglio plates, and those not reversed, are usually etched by the dragon's blood process, though Pigg's method might also be used in the aforesaid manner. The resist on the plate permits of the use of the Levy acid blast machine.

Having thus explained the technical details of the Paynetype process, we may now consider what in this commercial age is equally important, and I trust will not be less interesting, the economic value of the process and its suitability for various branches of photo-engraving.

In the first place, I should like to emphatically state that there are limitations to the use of the process. I find it necessary to make this statement because, for some unknown reason, and in spite of the fact that I have never claimed that it would do fine work — on the contrary, I have always insisted that the process was only of use in the coarser branches of photo-engraving — yet my critics will insist upon looking at the problem from the point of view of its suitability for fine work.

I again repeat, in capital letters, THAT THE PROCESS WILL ONLY BE FOUND OF USE IN THE COARSER BRANCHES OF PHOTO-ENGRAVING, and that statement requires me to define the difference between coarse and fine work.

Let us first study the question from the point of view of the use of the process in line work. Mr. Harold Hood of Middlesborough, after using the process for some weeks, states in his report that the process may be successfully used for 75 per cent. of the line work met with in their practice. But this statement, although interesting as coming from an outside source, is rather vague, because the value of the opinion lies in the average fine or coarse quality of the work they get to do in this studio.

To obtain some more definite information, I measured the width of the finest lines that I could reproduce upon the metal plate, by means of a micrometer used with the microscope, and found that the process was capable of reproducing a line $\frac{1}{250}$ inch in width. Personally, I consider this to be approaching the region of fine line work, and this view is borne out by the fact that I have had extreme difficulty in getting some of the finer blocks successfully etched. Do not think that this is due to the quality of the resist; this is not so, because I have lately found a firm who can etch good fine line work on these plates. But this is what I wish to say, that if the process is capable, as it is, of reproducing work of such a degree of fineness that there is difficulty in successfully etching the blocks, then the estimate of the process being suitable for 75 per cent. of the work met with in practice is under rather than over the mark.

Mr. William Gamble in his most interesting and valuable book on *Line Photo-Engraving*, which I counsel you all to obtain and read, gives, on page 58, a description of the requirements of a drawing made for reproduction by the older methods of photo-engraving, and I desire you to note that this description *is not* written for the Paynetype process. He says:—

"The lines should be firmly and clearly drawn, smooth, even and unbroken, not too fine or too close together. Even the finest lines must be black. Light effects must be produced by making the lines thinner and increasing their distance apart, and not by the use of pale ink. Thick lines in the printing borders, etc., should be well filled in; dark shading for shadows, etc., whether in single lines or crossed, should be open and in firm clear lines of suitable thickness, not too close together, not crossed and recrossed with fine lines. Intensity of shade should be shown by an increase in the thickness of the lines, rather than by their being placed close together. It must be borne in mind that in photo-etching there is a tendency for the lines to thicken, so that if they are too close they are liable to black up in the printing, and the work will appear heavy and unsightly. All shading should therefore have a somewhat lighter and more open effect in the original than it is intended to have in the copy. Cross hatching, unless very open, should be avoided, as it is liable to fill up in the course of etching."

These, then, are the requirements for a suitable black and white drawing for reproduction by wet collodion. It is only fair that similar conditions should be extended to the Paynetype process, and it is really surprising what a fine degree of work may be done by this process from a suitable drawing. Much of my work in the past has suffered from the use of unsuitable copies, and some of my finest examples of line work had to be destroyed because the holders of the copyright refused to give me permission to use them as examples: why, I do not know.

It is of course easy to reproduce several line jobs on one plate, and the copies may be on various tinted papers or cards, provided that the drawings are in *black ink*. In making this statement to process workers I have, on several occasions, been met with the retort, "Ha! but what we want is to reproduce the drawings to different scales on the same plate." I was not aware then that this could be done even by the collodion process, but it made me devise a method by means of which I can copy the same drawing several times on to one plate, either to the same scale or different scales, or several different drawings may be reproduced to varying scales on the same plate.

It is a very simple method, and may be found useful in other processes of photo-engraving, all that is required being a cardboard or ferrotype plate mask placed in the screen holder before the plate. An opening is cut in this mask so that when it is placed in the screen holder in front of the plate, a portion, say, one-sixth, of the plate is exposed, while the remaining five-sixths of the plate is protected from the light action. Thus, by altering the position of the mask in the screen holder, several consecutive and distinct exposures may be made upon the same plate. Such exposures, of course, are developed and manipulated together as one plate, which makes the method a labor-saving device, being much more expeditious than making several negatives and stripping them to print upon one sheet of metal. I employ a similar device in the production of combined line and half-tone plates.

The chief difficulty I have met with in line work done by the Paynetype process is in reproducing fine cross hatching. Of course, as Mr. Gamble says, it is not easy to do this with wet collodion, and I have discovered that in order to obtain the best results it is necessary to give a generous exposure. With under-exposure the gelatine film appears to lose strength, and to break away in the finer dots.

Half-tone blocks may be by the Paynetype process either direct from the original subject, from a print or drawing, or by copying a continuous negative. As I have already told you, it will not reproduce good *fine* half-tone blocks, and I think that in this direction a 133-line block is about the limitation of the process; and even blocks of this grade of screen are not easily made. The statement is supported by the fact that the thickness of a line in the 133-line screen is $\frac{1}{266}$ part of an inch, which is approximately equal to a line $\frac{1}{250}$ inch in thickness; that, you will remember, was the limit of the process in line photo-engraving. I prefer to confine myself to stating that, in practice, half-tone blocks may be made by this process with a screen up to and including 100 lines to the inch.

A novel feature of the process is in the elimination of the usual necessary print and the possibility of using the ordinary glass negative as the "copy." Therefore it is interesting to compare the qualities of a half-tone made by the Paynetype process from a continuous tone negative with that made by the ordinary gelatine dry plate from a print. Both these processes depend upon the gelatine bromide process, but the great difficulty that is met with in working with an ordinary dry plate from a print—that is, the difficulty of obtaining a fine dot in the shadows—does not exist when the Paynetype process is used, by which means it is quite easy to obtain solid black shadows. This, of course, is due to the fact that a negative is used as a "copy" in the new process, so that the shadows in the half-tone are really the high-lights in a negative "copy" and may be closed up without difficulty. To anticipate any difficulties that may be raised as to the difficulty of using a negative for a copy, it is well to mention that in press work the use of the negative is a positive advantage, because the time required to make a print is saved.

Process engravers have become accustomed to the idea of working from a print because such is essential under the present conditions, but if they will fairly consider the matter, they must confess that having to use a print is a disadvantage, for, to mention one point only, it must sacrifice some tone values.

The difficulty of retouching a negative original as compared with a print is more fanciful than real, and should be readily overcome by any competent photographer. For instance, a black line on the block may be readily obtained by running a line round the negative "copy" with a graver, which easily removes the gelatine film, and in a similar manner any portion of the subject may be outlined with a black line, or the black line may be printed on the block, whilst all that is necessary for whitening any portion of the print is to block out that part of the continuous tone negative with opaque. The press photographer will appreciate the fact that the negative is used, for even the few minutes required to make a print is frequently of extreme value in the rush of a newspaper office.

Apart from the slight alteration in the lighting arrangements, which are necessary because the negative must be photographed by transmitted light, there is no change in the usual process studio equipment. Various methods of lighting the negative will occur to the operator, but we may suggest that the negative may be held in the transparency frame in the camera, or it may be carried in a carrier fastened about one foot in front of the copyboard which is covered with white blotting paper, so that the light is reflected from the paper through the negative, or it may be held in front of an illuminated condenser, for which purpose an ordinary enlarging lantern with the lens board and bellows removed makes a capital substitute. Having arranged the negative so that it is evenly illuminated, the half-tone screen is placed in a camera and the "copy" focussed. The metallic plate is placed in the dark slide in the dark room (which ought to be lit by a yellow or orange light) and then inserted in the camera and exposed in a similar manner to any other plate. The speed of the plate being about equal to a wet collodion film, the operator will quickly be able to adjust the screen distance to suit these plates, about which there is nothing unusual, except that I suggest that a "flash" exposure be given to each plate; this will give a good fat dot to the high-lights, which will be reduced in etching.

I wish to emphasise the point that by making half-tone blocks in this manner not only is the time devoted to making the usual print saved, but also the necessity for reversing the image on the plate, so that working single-handed to schedule time, a half-tone block may be made and etched on the Levy acid blast machine in fifteen minutes. This compares well with the best known record of thirty minutes for one man making a wet collodion negative, printing in fish glue on zinc, and etching in the Levy acid blast machine.

Half-tone blocks made either direct from the original subject or from a print, of course, require to be "reversed" before they are etched. They are made in a similar manner to ordinary dry-plate half-tone negatives, except that it is necessary to avoid the use of a "flash" exposure. I find that it is quite possible to obtain a pin-point dot in the shadows running into solid blacks without the use of a "flash" exposure, which, in my hands, spoils the gradation in the shadows. I am aware that I tread upon dangerous ground in approaching such a subject as the formation of the half-tone dot, especially before such a highly technical audience as this, and that though I think it only proper to lay before you the deductions of one who is, after all, only an amateur in process operating, I will ask you to bear in mind that I do not want to be dogmatic, and really am quite open to consider that on this point I am wrong. If you can obtain the best results from your own method of working, by all means use it, and I will assist you to obtain these results by describing my methods.

In the first place I prefer to use only one stop, and it is immaterial to me whether it is round or square. I use the largest stop I can, consistent with a good screen distance, so as to shorten the exposure.

I adjust the relative size of the half-tone dot entirely by the screen distance, and I know by experience what the appearance of the high-light dot on the focussing screen should be when I adjust the screen distance.

The exposure, of course, varies with the "copy," but taking as a standard a fine black and white copy, that is, one containing both black and white, lighted by two 12 ampère enclosed arcs, and using a 65 line screen, the exposure was twenty seconds at *f*/40 with the screen set at $\frac{3}{16}$ inch from the plate. This exposure gave a full range of tone from a good high-light dot running into solid blacks. It seems to be necessary that the "copy" must be lit with powerful arc lamps, especially when half-tone blocks are being made. Mercury vapor lamps appear to be quite unsuitable for this process; at least that is my experience.

During the course of my groping in the dark, struggling with this half-tone problem, I formulated the following rules for my own guidance:—

A. If the copy does not contain white, then increase the screen distance and give the normal exposure.

B. If the copy does not contain black, use the normal screen distance and decrease the exposure.

C. If the copy is flat and contains neither black nor white, increase the screen distance and decrease the exposure.

The broad principle depends upon the *exposure* being so adjusted that either a pin-point dot, or else solid blacks, are obtained in the shadows, whilst *the screen distance* is set so that with the correct exposure for the shadows a suitable dot is obtained in the high-lights.

These particulars also apply to the making of half-tone negatives direct upon the metal plate from life, and for such work as this it is absolutely necessary to use only one stop. As some of you may be aware, I had the privilege of making the first half-tone direct from life in this manner in June 1909. The exposure was ten seconds at *f*/18, square top with a 65 Levy screen, and the portrait was taken in the open air. Of course, this prolonged exposure does not permit of the practical use of the process by the press photographer at present, but it should be noted that a very slow emulsion was used; and if the most rapid emulsions are found to be suitable for this work, the exposure may be reduced under similar conditions to $\frac{1}{14}$ second, which brings it within the range of practical politics.

Of course it will be necessary to devise suitable cameras for this kind of work, for it is obviously impossible to use the ordinary process camera. A light stand or hand camera will have to be fitted with screen gear. Possibly this may be best continued to be carried in a case, such as is used for focal-plane shutters, to fasten into the back of the ordinary camera so that the ordinary dark slides can be used and several views focussed and plates exposed without having to return to the dark room to change the plate.

I can, however, foresee trouble being raised about carrying half a dozen zinc plates in slides, for they are heavy, very heavy as compared with glass plates, but possibly by the time the plates are used in this manner the litho rubber offset machines will be in universal use, and then the plates can be made on thin litho zinc, which will considerably reduce the weight.

In conclusion, I may say that the process has been thoroughly tested under practical conditions, both in a newspaper process studio and a photo-engraver's establishment, and it was found to be a process that is eminently adapted for newspaper photo-engraving where the speed of working will be a most valuable feature, for it is possible to develop and etch with the Levy acid blast machine a half-tone block in about fifteen minutes: that is, of course, when a negative is used as the "copy."

The time required for making one line block ready for etching according to schedule is fifteen minutes, but this time may be considerably reduced when the work is undertaken on a commercial scale. For instance, my own record for preparing twelve half-plate blocks ready for etching was at the rate of $11\frac{1}{3}$ minutes per plate. Another record made by a young man of eighteen to twenty years of age was $12\frac{1}{2}$ minutes per half-plate. The whole of this work, in both cases, was done single-handed. This saving of time is caused by the possibility of dovetailing the different operations into each other. No wet collodion process with its attendant silver bath, no prism, no sweating of screen, no polishing of metal plates, no fish glue enamel or albumen, no printing, and only three cheap solutions, are all the features of the Paynetype process.

Thus for economic reasons the process will be useful in the production of line blocks in the ordinary photo-engraver's establishment.

Your esteemed Principal has suggested that it will be an admirable process for making half-tone posters by enlarging from a small half-tone negative direct upon the metal plate.

The process can also be usefully applied to the making of engraved metal plates for use as name plates, illuminated brasses for churches, engraved dials, furniture, goods, etc., by photographing printed matter, or line sketches, direct on to the metal plate, which is then etched and the intaglio marks filled in with colored wax, or dissimilar metals may be deposited therein, so as to form a species of inlaid metal work. I am not a lithographer, but from what I hear I understand that it is an ideal process for photolithography.

Of course with such a process as this it is comparatively easy to make modifications. The emulsion may of course be considerably increased in speed and also made color-sensitive. By using a bitumen substratum or resist, and laying upon this a normal coating of emulsion, ordinary line or half-tone negatives may be made, similar in fact to dry-plate negatives, and then by exposing the plate to the light, the bitumen resist will be printed so as to receive a positive image from a negative, and this plate could be developed in the usual manner adopted in the bitumen process, and by further slight modifications collodion emulsion might be used in place of the gelatine emulsion. In fact, suggestions may be made without end, but I consider that the process may best "win its spurs" in its present form.

A Proposed Enquiry Form for Buyers of Half-tones, etc.

THERE was recently printed in *System* a suggested form for use by customers whereon they might easily indicate exactly what they want in ordering engraving plates. It looked like a good thing. Were it properly filled out and employed it would certainly be a good thing—both for the customer, to express his full desire concerning the individual order, and for the engraver, who would not need to get back with supplemental questions of the simple sort we are all accustomed to, such as: "Excuse me, but do you want a half-tone plate or a zinc etching? Is it for use on coarse or fine paper? What size is it to be, and what, exactly, do you mean in using the word 'long'? Shall we retouch the print to improve it?—as we surely could do," etc. The form looked rather promising on first sight, and we asked one or two in the business as to the feasibility of its adoption by engraving houses, to be supplied by them to customers for their use. Here is the frank view of one man, who covers the case rather at length:—

"I thank you for the idea you submit, but regret to say that I do not believe it practical.

"In the first place, it is hard to catch a man at exactly the time he needs engravings or art work. The amount of work a salesman actually brings in himself in a month is in the ratio of about one to ten of the orders that come in by mail through his solicitation or through requests for him to call and get the order. As a consequence, the customer would necessarily have to be supplied with these slips, and he must keep them in a convenient pigeon-hole for his use when ordering engravings—which he would never do.

"The average buyer of engravings would be confounded in filling out an engraving order properly, inasmuch as he is not conversant with the many little questions that must be asked. Take, for instance, the fact (I believe) that seventy-five per cent. of the buyers of engravings do not know that a line zinc etching cannot be made direct from a photogram or a wash drawing.

"We have numerous requests wherein a man sends us a half-tone and requests us to make one 'electrotype' of that size, one electrotype of another size, and one electrotype of another size. We also get numerous orders from people who, though they say so, do not want a half-tone; they simply want the electrotype. Then the question of vignetting comes up; cutting out, square finish, etc., that the average buyer does not understand; also the retouching. Each subject can be retouched slightly or a great deal, and the customer has no way of judging how much time it should consume or how much money he should spend on it.

"Again, the screen to be used is a stumbling block, and it requires a salesman who understands art and the engraving business to be able to ask the pertinent questions and get the desired information. On ordinary work the customer can probably tell him these things and explain just what he wants, when the salesman is plying him with direct questions; but without such help I believe it would be impossible for the customer to fill out the blank. The customer has not the knowledge of the salesman.

"So where does the customer stand? The only way to secure a salesman for an engraving house, who thoroughly understands the business, would be to take the foreman himself and make a salesman out of him. But as a general rule these men are not gifted with the personality necessary.

"Some time ago I took an order for a bird's-eye view for a large milling company, which does a tremendous amount of advertising. There had been no order for engravings given yet, we merely contenting ourselves with getting the view to suit. When this was completed, the matter of various kinds of engravings to be made therefrom for various purposes could follow. Yesterday we received the O.K.'d drawing, and we had a letter advising us to 'make one electrotype for advertising purposes.' (That is a sample of letters which we are continually receiving.) As a consequence we had to write and ask him for size, for screen, for finish. Now, if he had a book of our forms such as you suggest and would refer to them, he would probably be able to give this order properly, but the question is, would he go to the trouble of hunting up this pad of order blanks before writing? *I doubt it.*

"Pretty nearly every engraving house in the country, at some time or other, has issued a book or a folder showing specimens explaining the nature of their work, and advising people how to order engravings intelligently, and copy from which different kinds of engravings could be made, but the receiver of such a book does not keep it.

"The above is rather a lengthy effusion, and I make it to explain why the average buyer knows practically nothing about engravings. I would be pleased to hear from others touching these views."—Condensed from *The Inland Printer.*

This same subject has recently received attention in *The American Printer*, from which publication we quote the following:—

"These columns recently contained recital of the experience of an engraver who told us according to his observation customers would *not* keep printed order blanks and use them in ordering engravings, helpful as they might be for this purpose—in that various kind of work is indicated for note and choice.

No. 1.

GLOBE ENGRAVING AND ELECTROTYPING CO., CHICAGO.

Please enter our order for cuts as per following instructions:

No. & Copies	**Size**
Subjects	**Screen**
Process	**Block on**
Style or Finish	**Proofs**
Color Plates	**Submit for O.K.**
Duplicates or Electros	

Special Instructions

Requisition No.	**Wanted**	**A.M. P.M.**

From

Address

No. 2.

SALESMAN'S MEMORANDUM.

For

Address

Half-tone	**Size**
Etching	**Screen**
Drawing	**Block**
Engraving	**Trim**
Color Plates	**Mortise**
Electros	**Proofs**

Instructions for Art Work, Vignette, Cut Out, Single or Double Line Border, Round, Oval or Square Finish. Submit for O.K. etc.

Promised **A.M. P.M.** **Salesman.**

"In response to this communication we have another, received from George H. Benedict, of the Globe Engraving and Electrotype Company, of Chicago, who declares a like experience and presents in forms No. 1 and 2 herewith, what was intended as material aids; the first for customers ordering Globe engravings, and the second for solicitors of this concern to ensure getting full data. The efforts to have these forms adopted failed from lack of response. Covering reference to the subject Mr. Benedict writes:

"'We have had like experience. At one time we made up order blanks similar to the sample marked No. 1 herewith and furnished them in tabs to our customers. It seemed so simple that we thought every one would use them and ask for more when the supply was exhausted, but we found it did not work — very few used them at all, and we did not have a single call for another block of blanks.

"'We also got up a memorandum blank for solicitors, like copy No. 2, which they carry around with them to help get all particulars. Both of these blanks are more or less like our regular order blanks, and neither is a success. Even the solicitors would not use them half the time, so that I think it is hardly worth while to try and educate the engravers to a method that will not be a success.'

"But trial is not education, and in the latter aspect of the case we know that time is the great element of success. Repetition of a suggestion is the power that finally leads to its adoption. We cannot all stop and conduct an educational campaign, however, and the line of least resistance is the profitable one, from a business view point. Perhaps, too, this direction doesn't much warrant the expenditure of time and trouble, yet the facts in connection are of some passing interest, hence we give them."

The "Scale" not Good Enough.

So says Louis Flader, a man who is in favor of the aim of the "scale," but doubts its adequacy to attain that aim.

Mr. Flader's conclusion, in the article which we condense from *The Plate-Makers' Criterion*, is much the same as has been arrived at by others—for instance, by Mr. Arthur Cox in our own pages. Some engravers still find the scale very useful, either employing it as originally intended or with modifications. Many others are satisfied that the plain per-inch system, with no variation except the "minimum," is unsatisfactory to the engraver, and works unfairly to the advantage of certain customers or jobs and to the disadvantage of others.

As the scale is the only alternative to the per-inch rate that has been tried and pushed at all generally, one is bound to approve of Mr. Flader's search for an alternative. He says:—

"Two years ago the so-called 'Sliding Scale' method of selling engravings was adopted by the Chicago Photo-Engravers' Association. Mr. Geo. H. Benedict worked out the theory, tested it in a number of different shops, and when practice virtually verified his contentions he made bold to assert them publicly. Being a missionary in the full sense of the word, Mr. Benedict at a sacrifice of time and money acquainted his brother engravers with the results of his investigations, showed them the error of their ways, and asked the adoption of his method of computation, affecting cost of manufacture and selling price. He worked upon the theory that once engravers realised the cost of production they would willingly and of their own accord fix upon an equitable and profitable selling price. He understood his plan; the rest thought they did, and it was adopted. It brought no beneficent results, however, for it was dropped by a number of its most ardent admirers (on the surface) almost as quickly as it takes to tell it. Just about the time it was adopted, a financial depression struck the country and the chase for orders soon overshadowed good intentions, and the sliding scale served no purpose thus far, except to lower prices. Yet it did one good thing. It caused engravers to think, and I honestly believe there are more engravers thinking of the sliding scale to-day than two years ago.

"We must assume, on the other hand, that the sliding scale having failed in its mission (or was it its alleged supporters that failed?) there was something wrong with it. What was it? If it is as good as its originator and supporters claim, why is it not in general use? The answer will probably be, 'Because we cannot make enough engravers see it that way.' That does not tell it all, to my way of thinking, and the fault lies deeper than that. I am free to confess that I do not know where the fault lies, nor whom to hold responsible for the present state of affairs. I do know that there is room for improvement, and in fact a crying need for it.

"For instance. How can you account for a difference of fifty per cent. in the selling price of engravings in one and the same city? At that, the lower price is quoted by a small concern, enjoying none of the advantages accruing to manufacturing on a large scale. But, 'being a small concern, they cannot possibly do much harm, since their output is limited,' say you. Wait a minute. It's true they cannot produce a great many engravings, but they can and do produce a great many buyers of engravings insisting upon and demanding the same low price. When the aforementioned frater buys a page space in a magazine and shoots up his good coin for the privilege of informing the public of his desperate straits and low prices, he's doing things to all of us and the engraving industry as well.

"To bring every one of us to a full realisation of our follies, whatever their nature, is not an easy task. It is said that crime is a disease; we know in many cases it is based upon ignorance. If we could dispel ignorance and disease we would practically, nay, let us say altogether, stop crime. The actions of some engravers, so far as their selling methods are concerned, approach criminality, to say the least. The panacea, then, is education.

"As soon as every engraver can be made to realise first of all that it costs him something to make cuts, and next, that his cost is not fully represented by the wages he pays his help and the materials they consume—not by a jugful—and after that the exact manufacturing cost, he will be selfish enough to ask for and insist upon profits. The ideal condition would be to make a profit on every piece of work turned out. The amount or percentage of profit might vary with conditions, but a minimum profit would always be had.

"I said, 'that would be the *ideal* condition.' Every one knows we're not quite ready for the millennium, and in the meantime we seem to be satisfied to go along in a happy-go-lucky sort of a way, and as long as we find something in the 'kitty' at the end of the month we're glad.

"That state of affairs is wrong—dead wrong. Other trades, notably the printers, are engaged in an immense campaign of education, in an endeavor to acquaint their neighbors and each other with their own business. It's tiresome work, this educating, especially when your neighbor don't want to be educated, but they are sticking to it, and with a great deal of enthusiasm.

"To start thought and discussion if possible, the opposite page shows a reproduction of Mr. Benedict's cost and price chart,* with explanatory notes. It is worthy of attention and study. I bespeak both for it. Its adherents in the beginning had high hopes for it. As a matter of fact it fell flat. Consequently it is not good enough. What will *you* do to put forth something better? A plan that will meet with the approval of the majority of engravers, and one that will result in a benefit to all."

* This has been reproduced more than once in our pages. Last time on p. 107 of the issue for May 1909.—Ed.

STANDARDISING EVERYTHING is the attractive title of a catalogue issued by the Miller Saw-Trimmer Company of Milwaukee. Making tools for printers and photo-engravers, they have very properly used the very best of printing and photo-engraving, and their list is worth obtaining by all process men if only as an example to show to their customers who may be producing catalogues. The type, printed in a grey-green, partly over the vignetted illustrations, is most effective, and an unusual but very successful little idea is a white line running through the vignette, continuing the text-space; thus giving a finish to the page and throwing part of the vignetting into the margin. In England, the Canadian-American Machinery Company, 8 Bouverie Street, London, E.C., are responsible for the Miller goods, and will gladly send catalogues or show the machinery at work.

To Sell Engravings: The Real Thing in "Process" Advertising.

AGRICULTURAL ADVERTISING has at least one man on its staff who believes in the value of illustration, and who writes about it as follows:—

"If I had anything to sell I'll print a picture of it, whether it was a bird dog or a buggy. If it were a bird dog, I'll know that every fellow interested in bird dogs would look at the picture the moment he laid his eyes on the page. And I'd know the same thing about the buggy.

"There is a lot of conceit about everybody. Nobody wants to admit he couldn't tell from the picture that the dog was no account. Nine times out of ten the fellow who buys a buggy by the picture will swear that it is exactly what he expected, whether it is or not.

"If I had something to sell that wouldn't take a picture, like baking powder or poultry food, then I'd print a picture of the package. Or, if I were good looking, I might print a picture of myself.

"The advertisements I remember are those with illustrations. There's that liniment for man or beast. I've forgotten the name of it, but I remember the picture, and that's the liniment I would recommend. I wear 'Boston Garters' because there is a picture of them on the back of most of the magazines I read. I heard my wife asking the store over the telephone the other day if 'they carried boys' underwear with holes in it like the pictures,' and a few days later I saw the kid with something on that looked like a minnow seine. Advertisements with picture in them have kept me poor—and happy."

Louis Flader, commenting upon this in *The Plate-Makers' Criterion*, points out that photo-engravers, who make and sell illustrations, are still willing to rely upon un-illustrated type announcements in the main. He quotes from another writer:—

"The best salesman I know has but one eye. With it he can see better and see more than any two-eyed salesman living.

"He takes but one look at the goods he is expected to sell, and their good points are instantly impressed upon his inner consciousness. So are their bad points, but he forgets them at the will of his employer; and with resistless logic, and clarity of expression, he acquaints customers with the good points as no two-eyed salesman ever has or ever will.

"Because of his ability to see all that was good and bad in an object; because of his wonderful knack of convincingly presenting all the goods with as much flattery added as might be desired; because he could forget all the blemishes and imperfections, thus keeping his enthusiasm always at the boiling point, he became employed by the great manufacturers and merchants everywhere to sell their goods; and he has sold more goods than all the two-eyed salesmen taken together.

"He has sold safety razors and threshing machines; hatpins and sabins; carpet sweepers and electric cranes; horse collars and diamonds; and not content with these practical efforts, he has with rare art decorated the advertising matter of the firms that make or sell these things.

"He has covered their calendars, posters, counter cards, magazine advertisements, window displays, and the like, with pictures of beautiful women, pretty landscapes, dainty marines, rare flowers, fruits and vines, Indians, cowboys, wild animals in action, stirring incidents of town, country and border life, and scenes beyond the seas.

"To cap the climax, it is perfectly true that his ability is all in his eye, for he is a *camera*."

This sort of argument, practised as well as preached, should tend toward much more general use of process work.

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The Modern Three-Color Process.

By Paul R. De Turbeville.

An article that might be reprinted and circulated with specimens, as excellent advertising for a three-color firm.

THE successful adaptation of the three-color process for commercial purposes is one of the greatest successes of the modern art of printing. Everyone connected with the craft is interested in the subject. The present degree of accuracy and reliability attained is the result of thirty years of experiments of a highly technical kind, involving the most subtle speculation concerning the nature of color sensation and the action of light.

It is an never-ending source of wonder to those unacquainted with the process that practically all the colors of the rainbow can be obtained from three impressions on an ordinary printing press. To the business man, used to lithography, where from five to twelve impressions were required to get really good color effects, the three-color process seems a kind of modern wizardry, and to the artist who has long suffered from the efforts of the lithographer in transferring his drawing to stone, the new direct photographic process seems like the dawn of the millennium.

The color process is particularly well adapted to the wants of the advertiser, as its results are always striking to the eye. The public, whose vision wanders over page after page of black-and-white cuts and type matter, is instantly attracted and held by the emphasis of a color reproduction and the enormously greater force and sense of reality with which it renders its subject. It is this power to attract and favorably impress that gives the process its great value from a commercial standpoint.

The concern with merchandise to sell must not only attract favorable attention to its line, but it must hold that attention when once secured. A faithful portrayal of its wares is therefore essential. What can carry more weight than the photographic reproduction on the printed page of the actual texture of the goods in their natural colors? Used in this manner in catalogues, the uses of the process are extending with marvellous rapidity.

The untold good that is being done by the process in bringing faithful copies of beautiful paintings within the reach of even the smallest purse and humblest home will leave its impress on the coming generation and help to raise our people as a whole to a higher plane of artistic appreciation.

The successful application of the process is not so new as many people think, but it is only within the last few years that theory has been reduced to practicability, and engraver and pressman become so trained and skilled that unvarying and reliable results, day in and day out, have been achieved, thus placing the process on a firm commercial basis. Many an engraver and printer has gone bankrupt, a martyr to the cause, endeavoring to make the color process a marketable product. But with the coming of the well-organised modern colortype companies, with their forces of thoroughly skilled specialists—artists, engravers and pressmen—the problem has been solved and the business given an assured standing. The output is increasing with tremendous strides, but still fails to satisfy the demand.

The fundamental principle of the process is the photographic separation by means of color screens of the colors from the original painting or natural object, and the recombination of the separated colors on the press by means of three printing plates, run in red, blue and yellow. As all colors are composed of the three primaries, combined in varying strength, practically every color can be obtained from three plates. For instance, by photographing through a colored filter all of the yellow tones are secured, and by using a differently colored filter all of the reds are obtained, and by still another color filter all of the blues. In the composite colors only the right strength of the primary is taken, which, when combined with the other components, will give the same color that exists in the original. The three primary colors are thus secured on separate negatives, so that when combined again they will produce all of the varying shades and tones of the copy. In theory, this is done entirely by means of screens and chemicals, but in practice it requires the utmost skill and a comprehensive knowledge of the finest distinctions in color values on the part of camera operator and copper etcher.

Many effects can be obtained that were impossible to procure on stone. Where an object of merchandise is to be shown for catalogue or other printed matter, the three-color process is ideal.

In many cases the work is done direct from the object. Especially is this true of carpets, silks or other fabrics where it is essential to reproduce the texture of the material.—*The Pacific Printer.*

*The Properties of "Gelatose" (Fish Glue) in Process Work.**

It appears proper now to consider the technical bearing of the results of this investigation so far as concerns the use of gelatose in photo-mechanical photography. This class of substance has been used from the earliest days of photo-engraving in the production of relief blocks. In the so-called "wash-out" process a gelatose was employed, which was prepared from gelatine or ordinary glue by prolonged heating in water, with or without the addition of alkali. In such a process the glue would be preferable, because owing to its state the setting power would be more easily destroyed than would be the case were high-grade gelatine submitted to similar treatment. In later times, and with the advent of different methods for the production of "resists" for the making of type-high printing plates in half-tone, gelatose has been used in those processes, for which the generic term "enameline" has been employed. The form of gelatose most generally used for this purpose is that known as "fish glue," which is employed in the arts for many purposes, and of which there are several kinds. Recently there have been introduced into commerce from different sources other forms of gelatose for the specific use of the photo-engraver. The most obvious advantages obtained in the use of gelatose as against ordinary gelatine arise from the fact that the former body is soluble in cold water. There are, in addition, certain other improvements in the technical result which are well known to the user. Briefly, the making of a resist depends on the production of an image of insolubilised gelatose by exposing a film of the organic material in conjunction with an alkali bichromate to the action of light under a suitable negative, and the subsequent removal of the unchanged portion by the solvent action of cold water. Eventually the plate of zinc or copper upon which the image or print rests is strongly heated, when the insolubilised substance becomes altered in character, forming what is technically known as "enamel," in which condition it is capable of resisting the action of the etching mordant, nitric acid or ferric chloride respectively, employed to remove the unprotected portions of the metal.

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* A portion of a paper read before the Manchester section of the Society of Chemical Industry by Mr. Chas. W. Gamble.

The differences exhibited by these forms of gelatose and the variations shown by a particular kind are matters of common knowledge; but not so, however, the cause of these differences, which hitherto, so far as the author is aware, have not received attention. All these substances are cleavage products of collagenous bodies, and their behaviour with respect to alkali bichromate is similar to that of gelatose from "pure" gelatine. The differences shown in the various samples of gelatose issued from time to time may be understood by following the differences exhibited with gelatine in its passage from the parent substance to that state in which it no longer yields an insoluble mass with chromium oxide.

Commencing with collagens, we can produce by the action of hot water the substance gelatine, which yields the maximum amount of insoluble matter when exposed to light in conjunction with an alkali bichromate. If the gelatine be submitted to further hydrolysis until such a stage is reached that the body loses its power to get at normal temperature, we have converted the gelatine, broadly speaking, to gelatose. This body will still yield a large amount of insoluble substance with a bichromate on exposure to light, and at this stage it may be said to be in its most useful state for the purposes of the photo-engraver. If the hydrolysis, however, be continued beyond this stage, the gelatose is converted into gelatine peptone, and when this condition is reached it ceases to form an insoluble substance with an alkali bichromate, and is therefore of no value as a material for the production of prints. The changes are not sharply defined, and there is a change in property of the gelatose according to the proportion of gelatose and gelatine peptone.

From experiments which have been extended over a considerable period I have been led to the conclusion that the usefulness of a gelatose for photo-engraving purposes is largely a question of the gelatine peptone content; and that if precautions are not taken in the manufacture to ensure this being kept low, the print or resist yielding capacity of the body when exposed to light in conjunction with a bichromate will be reduced. If the proportion of peptone to gelatose be above a particular amount, although a certain quantity of insoluble substance be yielded, there is not sufficient to form a coherent mass, the image washes away in development with water, and this effect is shown, whatever be the exposure (amount of light energy) received. This phenomenon always appears with gelatose from over-digested gelatine, and it may be produced without difficulty with a sample of satisfactory ordinary gelatose if there be added to the same a certain quantity of gelatine peptone.

Inasmuch as the formation of a coherent insoluble mass is a necessity for the production of a satisfactory print, and as the property of yielding such is the criterion of value to the user of bichromated gelatose, it is worth while to consider how the presence of peptone acts as a detriment. The film of the bichromated gelatose before and after exposure to light may be regarded as similar to a thin layer of dry and compressed sponge. Dispersed through the film are particles of peptone. Both bodies re-act with the chromium salt, the gelatose only yielding a substance insoluble in water. When, after exposure, the film is treated with water for the purpose of removing the portions unacted on, those under the opaque parts of the negative dissolve away. The parts affected, however, swell, and the peptone portions dissolve out. There will be in consequence a tendency to lessen the coherence of the particles forming the sponge-like mass of insolubilised gelatose. If such a process be carried far, the mass disintegrates and the print washes away.

It is not absolutely necessary that the gelatose through the whole of the thickness of the film be rendered insoluble, though for the production of a firm print there should be a very small amount of soluble matter remaining. The greatest light-action takes place on the top portion of the film, the soluble portion, if any, will be close to the metal, and the adhesion of the film to the metal will be lessened when the mass is treated with water, by solution of the insufficiently altered gelatose, and in consequence the print may wash away from its support. This effect is a common sign of insufficient exposure—of "under printing." From this it will be seen that peptone which will not become insoluble, and a mass of gelatose not yet brought to the insoluble state, produce effects on the printed image which are similar in character.

To which cause the trouble is due may be ascertained by exposing fresh films to light for a more prolonged period. With gelatose containing peptone to any extent, although prolonged exposure may produce an image which persists, it will always tend to disintegrate, and moreover, such images will have a porous character even when converted to the enamel stage. With prints showing this condition, the mordant may penetrate the film and attack the metal underneath. In the experimental tests which have been made it has been shown that with the increasing proportion of peptone the peculiar sponge-like characteristic increases until, when the quantity of peptone passes a certain proportion, the image does not persist but washes away during development When, therefore, gelatose containing gelatine peptone in excessive quantity be used, it is necessary to prolong the exposure of the bichromated film to an undue extent, more than would be necessary were the latter constituent absent. Assuming the light-source to be constant, increased exposure means an increased amount of energy received by the film. If when using two samples of bichromated gelatose one requires more exposure to light to produce a desired effect than the other, it is said to be less "sensitive." Such is the common expression used to denote the difference. Without qualification, serious objection might be taken to the use of the term. It is employed here in the sense denoted, and with the explanation given, merely because no other simple term appears to be open to less objection. It is necessary to observe that when tests of gelatose in different conditions for comparative purposes are made, the thickness of film employed and the proportion of the alkali bichromate should not be altered. An investigation into the differences that may be produced by variations in these respects is now being carried out by my colleague Mr. R. B. Fishenden, and will be published in due course.

If the presence of a soluble substance like peptone acts as a disintegrant, it might be inferred that other bodies might play the same part, and experiment shows that such is the case. The addition of glucose to the extent of 5 per cent. of the value of the solid content of glue in the sensitive solution produces marked difference, the film tending to wash away, even after unduly long exposure.

The production of a "gelatose" containing only those constituents which yield insoluble bodies with chromium oxide is much to be desired, and investigation has been proceeding for some time, having such object in view. It is not difficult to produce a gelatinous substance that is freely soluble in water, and which is "sensitive" in the meaning of the term previously given. But owing to the method of use the gelatose must possess *ab initio* considerable viscosity in order to allow of the proper viscosity being obtained in the bichromated solution. Such a property is not easy to obtain except when the content of gelatose in the liquid is high, and this results in a relatively high cost. So far as concerns sensitiveness, the most satisfactory condition is when the subtance contains unconverted gelatine. If, for example, a 40 per cent. solution of gelatine be hydrolysed until there remains only sufficient unchanged substance to form a tremulous "gel" at normal temperature, a film can be prepared which is extremely "sensitive," but the viscosity is so slight that it is far from simple to produce the necessary thickness of film. The attempts to produce increase in viscosity by the addition of salts have so far not yielded results of any appreciable value. To increase viscosity by the addition of unconverted gelatine, or by leaving a residuum of such gelatine (although this method has been adopted in some instances), is not satisfactory; the gel state is produced, which is different from the viscosity of a concentrated solution of gelatose, the state to be aimed at. Some of the products commercially put forward have failed in use owing to inconstancy of composition due to putrefactive change, a change which is neither arrested, nor is its presence disguised, by the addition of safrol or of synthetic perfumes, coumarin, vannillan, and the like. So far, the form of fish glue now in use has proved the most satisfactory. Its high solid content (amounting to about 70 per cent.) of non-gelling substance is the cause of its remarkable viscosity, though it is proper to observe that of two samples the more viscous is not necessarily the more "sensitive," for an aqueous solution of peptone alone will be, with sufficient concentration, equal in viscosity to one of gelatose, and, moreover, cannot be distinguished from it. The attainment of constancy of composition and character is not a simple problem, and in many respects the necessities are met. It appears, however, that it may serve a useful purpose to indicate the conditions which should be fulfilled in order that the substance may have the greatest value in a photographic process of the kind considered.

The considerations offered may serve to suggest that possibly valuable results might accrue from a more extended study of the influence of the cleavage products of gelatine in photographic processes, where this substance is employed. It is conceivable that the maker of emulsions for photographic dry plates might find in this way a clue to some unsolved problems.

How Lenses Differ.

LECTURING at the Bolt Court School, Mr. Clifton, in introducing his subject, said most people have an idea of only one lens, and that was the particular one they were using. In one respect there was one common ground in all photographic lenses, and that was that they must be capable of producing a positive image that could be retained on a plate. When they departed from that there was a very large number of divergences. There were the photographic lenses that were non-achromatic and those that were achromatic. In a large number of cases, particularly of late, lenses had been made which had what was called a chromatic focus, *i.e.* the visual and the actinic foci were not made coincident. In the period before we had our anastigmats it was usual to denominate lenses according to the work they were proposed to do. Portrait, landscape, copying, group, architectural lenses, and whatever a man fancied a lens was capable of doing, he called it accordingly. Besides that, many were called according to their construction and in some cases according to their characteristics.

PORTRAIT LENSES.

The portrait lens had kept its name, and that retention, he thought, had militated against its use until very recently. Many of the oldest portrait lenses were excellent and very useful within certain limits, and they might be purchased very cheaply. The portrait lens was large and heavy, and possessed great rapidity. It was rather difficult to use on modern cameras, but if they had a camera that would carry it, it was useful for many other things besides portraits. It had been made up to an aperture of $f/2$. Glass lenses had been made up to an aperture of very nearly $f/1$. But the portrait lens was commercially made as large as $f/2$ and as small as $f/6$. The effective field at full aperture was small; that was to say, that with the portrait lens you had a small curved field. Curvature of the field was often confused with curvature of the image or distortion. To get sharpness all over you should have a saucer-shaped plate corresponding in radius to the focal length of the lens, so that all rays were at the same distance. A lens which had a round field was usually free from astigmatism. If you remedy it by lengthening the tube of the lens you get a flatter field and generally better definition, but it was impossible then, except by stopping down to an enormous extent, to get a really good definition at the edges. Focus as you may, you cannot get rid of astigmatism.

The portrait lens was still extensively used for studio portraiture, but latterly it had not been used much for outdoor work. Its only defect was that you must use it with a large aperture. If you stop down you get a liability to flare. Quite a number of artistic workers took some of their views with a portrait lens, and they had found that you can get a quality with these large lenses that you cannot get with the modern lens—a sort of roundness and a flood of light coming in that was extremely useful in getting pictures near sunset. You get an amount of detail and softness in the shadows that you cannot get by a longer exposure with a smaller lens. A lens of not less than 8¼ inches should be used for a quarter-plate, and in many cases, especially for natural history work, a 10-inch lens was better still. A 10-inch portrait lens could be got at a very reasonable price, and it would answer their purpose just as well or even better than the anastigmat specially provided for natural history work. A portrait lens negative if properly focussed would stand enlargement to a larger size than any other he knew. It was practically only limited by the grain of your plate. To a great extent that was due to the construction of the lens, which allowed a final adjustment in the individual lens by separating the two back components. The smaller lenses working at *f*/6 were often called group lenses, and were used for general outdoor work and groups, or anything where rapidity was wanted.

LANDSCAPE LENSES

were a very large class. The largest aperture of the single lens was as a rule *f*/10, and from that it ranged to *f*/16. The definition of this lens was very even over the plate, and in many cases a good single lens might be preferred to a rectilinear. One of the merits of the single lens was that owing to its simple form there was very much less reflection and scattered light, and they found a much more brilliant image on the negative. The single lens had kept in vogue up to the present day, and he supposed there were now more of them in daily use than there ever were in the history of photography.

The double lenses formed by far the largest class and had been the most used. The typical one was the rapid rectilinear, which had been a good servant in its time, and there was no reason why one should at the present time despise it. If they got a good one they would find it was nearly as good as an anastigmat.

A great deal of caution was necessary in buying a rectilinear, because there had been a great many bad ones on the market. The usual angle was about 40 degrees and the usual aperture *f*/8. A little tip in focussing with large sizes was always to focus with a medium stop. Even if you are going to use at full aperture, focus with *f*/11 and then open it out; if smaller, focus with *f*/16 and stop down afterwards. You will get a better general result than if you focus with the stop you are going to use.

Wide-angle rectilinear lenses were very similar in construction to the rapid rectilinear, but they were made much shorter in the body and usually of a larger diameter at the back. They were sometimes symmetrical in construction, as was the case with the Ross wide-angle lens, which was a very large flat lens giving very excellent results. Another very useful set of wide-angle lenses was the Portable Symmetrical of Ross, and there was a time when people were very proud of having a set of them.

Another old lens that was very useful and was still used by many people for process work was the triple aplanat. It had a very flat field and gave excellent definition, was free from distortion, and was altogether a good lens. He had known cases in which, on account of the price, a triple aplanat had been selected in picture copying in competition with some of the best anastigmats in existence. Its full aperture was *f*/12, but it gave good definition at that, and there was absolute freedom from flare.

The modern anastigmat lenses were, of course, the best known, and he did not therefore propose to say much about them, but what he would like to point out was that though anastigmats were said to have a flat field, there were very few of them—in fact, he could only at the moment recall one that had an absolutely flat field, and that was the Cooke lens. In most anastigmats, instead of getting a straight field, there was a slight curve. In testing a lens they should try and test it as near as possible at about its proper equivalent focal length.

A class of lenses that had become very popular lately was those in which the correction for large aperture was got by using air spaces. An air-space lens certainly gave wonderfully good results, but they had to be used with caution, and every individual lens wanted very careful adjusting. They could not make up a batch of air-space lenses and put them through with the little amount of adjustment that they could with a number of cemented lenses. Another point was that they were very liable to flare.

VARIATIONS IN LENSES.

The lecturer dealt with variations in individual lenses. This occurred even if the lenses were of the same size and make. In many cases the variations were due to the manufacture. The manufacture of lenses, like that of violins and other works of art, depended to a great extent on the individual taste of the person who was making them. The making of rectilinear lenses in the same business would pass through different hands in the course of years, and then one man would perhaps have a particular aversion to one kind of defect in the lens and allow a considerable amount of another defect to come in in order to get rid of his particular aversion. That individual influence in lens manufacture would to a great extent prevent all lenses, even of the same size and make, being exactly the same. Very often its variations were accidental, because a different batch of glass would necessitate a different set of calculations, and the lens, though coming out a good lens, would be slightly different in character. In the case of second-hand lenses, or lenses of which you don't know the history, a very important point was the effect of the treatment the lens had had since it left the maker's hands. The most noticeable of these defects was the loss of rapidity due to the discoloration of the glass. This occurred in many more cases than one would imagine. With isochromatic plates it was not so noticeable, but taking ordinary plates it was surprising to find what a considerable difference there was in the rapidity of an old and a new lens. At the same time it had an effect on the character of the image. A lens exposed to the light and air very soon altered in color. If it was used for enlarging, the heat also made a similar change. When they were going to compare lenses they required to know very accurately what the focal length was, and what the apertures were. They could not always depend, at all events in the case of the older lenses, on the catalogue description being always adhered to.

"Sketches Submitted Free": An Old Problem Crops Up Again.

All our readers know the customer who wishes them to submit designs "on spec," on the chance that he may appreciate their work, in which case he will buy. The half-dozen designs which do not happen to be appreciated, mean dead loss of time and labor for those who submitted them. The following correspondence explains itself:—

To The Lammers-Shilling Co.

Gentlemen,—We are considering the adoption of a trade mark or device to be used as the emblem of this company, and if you wish to submit a design for our consideration, we would be pleased to have you do so. Please understand that we do not obligate ourselves in any way for the design you may submit, nor shall we pay for any expense you may go to in getting up such a thing for our consideration, unless we decide to adopt the same. Our idea in writing you is to give you the opportunity of submitting a design if you care to.

The design should be simple and in not more than three colors; in fact, a two-color design would be more in line with our ideas. It is our idea that a design emblematical of our company name would be most appropriate, or possibly a design suggestive of our industry. This design will be used on our letter-heads and other stationery, advertising matter generally, and probably on our cars.

If you wish further information relative to the same, kindly address our Advertising Department at the Union Stock Yards.

The National Packing Company.

Chicago, December 21, 1909.

National Packing Company.

Gentlemen,—We beg to acknowledge your letter of the 17th regarding the possible adoption of a trade mark. We are very much surprised to receive a request from a house of your standing asking us to donate our time and that of our artists in an endeavor to produce for you that which ultimately will be valued at thousands of dollars and for which you are not now willing to pay the cost of production.

Now, if you sincerely desire a trade mark which shall be used as you suggest and shall ultimately stand as the symbol of your company, we will sell you as much of the time of our designers as you are willing to pay for to assist you in the search for a suitable trade mark design. We cannot afford to donate our time and money to the National Packing Company, since we are in business for profit, and our profit comes from selling our time and that of our artists for the purpose of developing satisfactory designs, etc., for a cash equivalent.

Under these conditions we shall be pleased to enter your order for the development of a satisfactory trade mark at a stipulated price of $100.00, or we will send you the bill when the work is completed, charging you only for the time and expense involved.

The Lammers-Shilling Company.

Chicago, January 17, 1910.

The Lammers-Shilling Company.

Gentlemen,—Answer to your favor of the 4th inst. was delayed owing the writer's absence from the city. As yet, we have not placed our order for a design, although quite a number of drawings have been submitted to us. Our purpose in submitting this matter to a number of designers, rather than placing the order with one, was because we felt that in that way we might find some one idea which would suit us better than where we limited ourselves to but one company. We certainly expect to pay for any design we might accept, and we felt that you might wish to submit a sketch on that basis.

National Packing Company.

Chicago, January 18, 1910.

National Packing Company.

Gentlemen,—Your letter is at hand. In reply we wish to say simply that our position remains exactly as stated in our former letter. We are surprised that the National Packing Company should ask a number of individuals to donate their time and ideas. Many of these individuals are not financially in position to spend their time developing something for you. If you wish to get the different ideas from different people, the least you could do would be to offer to pay for these ideas.

We venture to say that the National Packing Company would not donate fifty or one hundred pounds of meat to any one of these individuals should they write in for it as a sample of what your products are. Is the position you assume toward these artists and designers any different from the one just cited? If these designs are worth anything to you, they are worth paying for.

We note in the last paragraph of your letter that you say you expect to pay for any design you might accept. We would like to illustrate this matter to you by calling your attention to a similar scheme as adopted by the International Harvester Company.

A few years ago they let it be known that they were in the market for a design for a calendar. There were submitted by the various lithographers of this country designs the value of which would amount to several thousands of dollars. Out of this lot only one could be selected. The rest were a dead loss to be charged up to the profit and loss account of the concerns making them. You may think that this was their loss, but it was not. If you bought any work of any of these houses that were doing speculative sketching in this way, you paid for part of those sketches. So did everybody else who bought anything from the houses submitting work on these lines. If this were not so, these houses would go bankrupt.

Suppose, for example, that you do make a selection out of these designs which you receive; as cited before, the rest of the designs are a total loss to whoever made them. You do not pay the fortunate one any fancy price for his design. You merely pay for the time required to make up the drawing.

It is not a fair and square proposition, and, as we said before, we are surprised that a concern the size of the National Packing Company should ask a number of smaller concerns to donate time and money to them. We have tried to make this matter strong because we feel very strongly on this point. We shall be glad to see the day when such requests shall be unknown.

THE LAMMERS-SHILLING COMPANY.

Writing to *The American Printer* concerning the above matter the Lammers-Shilling Company remarks:—

"There are a number of people in this country who, either from ignorance or wilfully, persist in sending the various designers such letters as these. You are at liberty to use them; and we shall be glad to see a discussion of this subject—the 'something-for-nothing' idea—in your columns. It might tend to wake up some of our craft and make them see that they are, in complying with such requests, giving away that which is exceedingly valuable to the parties receiving it, themselves being impoverished thereby."

The American Printer heartily endorses the stand taken by the Lammers-Shilling Company.

Specimens and so forth.

WARLEY GARDEN IN SPRING AND SUMMER is an unusually fine publication in collotype. It has forty-one collotypes, 16 x 12 inches, from photograms by Miss E. A. Willmott, the owner and cultivator of the famous garden at Great Warley.

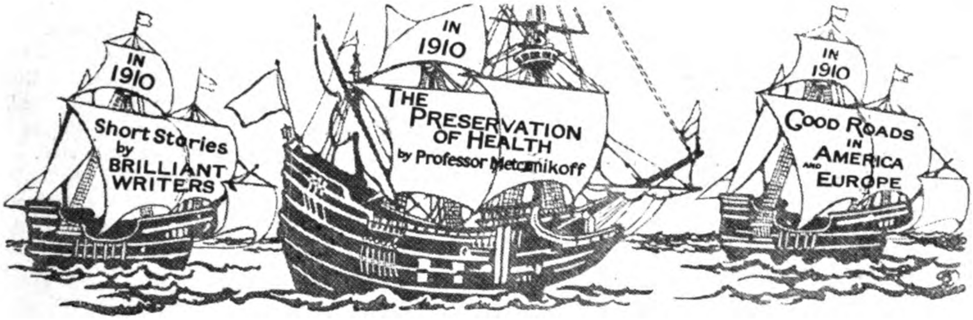
GEBR. DELGEUR & Co., of Rotterdam, are persistent in their specimening, and send some fine examples of their work in half-tone and in photogravure. For some months they have been issuing one-month hanging calendars, each with a good print.

A VERSATILE BATCH of excellent specimens shows that the Half-tone Engraving Co. is still producing and pushing the sale of up-to-date first-class reproduction work. The work is from all kinds of originals, reproduced in line, half-tone, and color, and shows how very fully the company is equipped for producing as well as reproducing effective advertisement and illustration.

RE SCREENS.—Vaus & Crampton, Ltd., issue a capital booklet with proofs of the same subject half-toned through various screens from 50-line to 200-line. They define them as "Open to medium" (50 to 80), "Medium to medium-fine" (100 to 133), and "Fine to very fine" (150 to 200). Also, instead of describing them as "so-many line," they are indicated with the number and the double dash (") that is used by architects and others to indicate inches, thus—150".

Brevities.

FROM GERMANY TO AMERICA several process photo-litho houses have removed their plant, or established new factories in the States, since the recent increase in tariff on picture postcards. Two of the latest are Theodor Eismann of Leipsic, and Stengel & Co. of Dresden, who have established in Brooklyn and New York, respectively.


IN 1910
Short Stories by BRILLIANT WRITERS
IN 1910
THE PRESERVATION OF HEALTH
by Professor Metchnikoff
IN 1910
GOOD ROADS IN AMERICA AND EUROPE

An effective announcement, combining the use of black, white, and flat tint in a rather novel way, is illustrated in the cuts which we copy from an advertisement of the Century Publishing Company, New York.

The White Plague is to be handled even more firmly than before by the I.P.E.U. It has been decided that the transportation of patients from their homes to the sanatorium shall be paid by the central funds, and not by the locals. The reports on last year's cases are most encouraging.

The Litho and Offset Engraving Company, 125 White Street, New York, is the first concern to be established especially for preparing matter for the offset press. At present it is sending transfers over nearly a half of the United States, and it is contemplating the establishment of branches in the principal Central and Western cities.

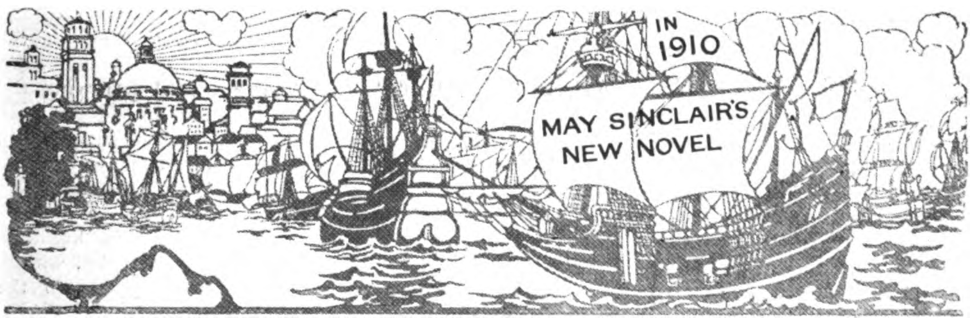
Line-wages versus half-tone wages proved the subject of a brief strike in St. Louis, where all ranks of employés struck, on a demand that the wages of the line-engravers should be raised from $18 (£3 15s.) to the same scale as the half-tone engravers, or $21 (£4 7s. 6d.) per week. A compromise was effected whereby the wages remain as at present to the end of June 1911, after which the demand will be granted.

Three Kinds of Finish — 1, outline; 2, partly outline, with vignetted base; 3, full vignettes, are illustrated in three coarsenesses of screen on a Gatchel & Manning "dodger." The subject is a machine-detail, and the suggestion should be useful to many a catalogue compiler.

The Half-tone Engraving Co. is fortunate in having enthusiastic and eloquent endorsement from such men as George C. Haité, J. Edward Goodall, Hassall, the posterman, and others, and is wise in circulating them in *facsimile.* A few of these, with proofs of the works to which they refer, and possibly with portraits and brief biographies of the artists, would make a most attractive and convincing booklet of specimens.

The method of charging for blocks was discussed at the I.A.P.E. meeting in New York, when it was found that while some engravers measured the block (base of mount), others measured the printing surface only, in charging. It was decided that the former method should be adopted by all the members present, and it was estimated that the change would mean an increased income for houses making it to the extent of 10 per cent.

It was also resolved that charging by the "Scale" was preferable to measuring and calculating.



A FINE NEW BUILDING of their own at 352 Adelaide Street W., Toronto, now houses the Alexander Engraving Co., which has moved from 16 Adelaide Street W. The company has been twenty years in the old premises, and has had a hard fight with competition, but has grown —much or little—every year. Mr. B. F. Bennett, the manager, has contributed much to the success, and is very proud of the new building with its fine installation of plant.

THE IMPORTANCE OF THE OFFICE, the department where customers are interviewed, is only beginning to be recognised by photo-engravers, and it is noteworthy that very fine and ample accommodation for the clerical staff as well as for callers is provided in the new premises of John Swain & Son, Ltd., and also of the Strand Engraving Company. Probably, as the businesses grow, these ample spaces will be subject to some encroachment, but the fact that they are provided in such up-to-date concerns is important.

CATALOGUE ILLUSTRATION.—At a recent meeting of the Technical Publicity Association it was argued that that form of illustration should be selected which is most easily understood by the people the book is to serve. Engineering persons easily read blue prints, and it is legitimate to detail sections and parts by blue print reproduction. But the blue print strikes terror and repels when given to another class of people. Probably nothing better has been developed for purposes of commercial illustration than the half-tone. Some subjects still lend themselves to woodcuts, and wood engravings are preferred in many fields, particularly to illustrate hardware mechanisms.

The retouched photograph and half-tone engraving are cheaper than woodcuts if the subject is complicated and the engraver an artist.

THE CARE OF ORIGINALS.—Numerous and forcible complaints are constantly being made by customers of various process houses on account of the ruined state in which their originals are returned to them. This means (in many cases) a great loss to the owners, and, moreover, it often causes them to transfer their work elsewhere. "How can this be remedied?" I believe there is a frame on the market to hold originals while they are passing through the hands of the etcher, but I have never seen one in use. Some time ago I hit on the following plan for keeping all classes of originals perfectly clean. First of all get two pieces of clean glass 12 x 10, or 15 x 12, according to size of original, and place the photograph or drawing between; then clip the top and bottom or two sides, with trouser-clips that are used for cycling. This will be found a cheap frame and easy of manipulation, and it also has the advantage that you can make it to fit any size of original, by using sheets of glass that correspond with it as regards size.

I have found this work admirably, and with this frame in use one does not mind the etcher's boy, who generally leaves his imprint (an inky thumb-mark) having a look at the original.

THE NEW SWAIN BUILDING includes many features and advantages that may well be considered by photo-engravers erecting new buildings. The mere fact of working in sumptuous, well-planned premises, instead of the make-shift, adapted buildings in which process workers first began, must tend to make everyone more contented, more ambitious, and more healthful. Amongst the features of the new Swain palace of industry are: artistically decorated and comfortably furnished waiting, reception, and consulting rooms for travellers and customers; all departments under one roof; large floors, all lighted on three sides; fireproof-built on the system of the Columbian Construction Company, hydraulic lifts for goods, and electric service lifts for interchange of copies, plates, proof, etc., between departments and office. Complete system of internal telephones, and increased number of internal extensions from main telephone exchange on the first floor; private wire to works. Electrically synchronised clocks all through the building; etching machines for both line and half-tone; Levy powdering machine; complete ventilating systems in electrotyping, etching, and photographing departments, rendering the atmosphere pure, cool, and healthy. Complete installation of hot-water heating, on the system of the National Radiator Company, lighting partly electric and partly gas, the latter on Keith's latest system of producing compressed gas, by which high efficiency is produced at the lowest cost. The same system is used for melting metal in the foundry, thus doing away with the dirt attendant on the use of ordinary fuel. Also for the numerous heating stoves and blow-pipes used in various departments. The gas compression plant is duplicated; in fact, every plant is duplicated throughout the building, thus obviating the risk of a breakdown.

On the roof is a large airy studio for half-tone operating and commercial photography, with a hydraulic lift for taking heavy goods to the studio.

Estab. Jan. 1894.
"The Process
Photogram."

THE PROCESS
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THE PROCESS PHOTOGRAM ESTABLISHED JAN 1894

VOL. XVII. No. 197.
MAY 1910.

Edited by H. SNOWDEN WARD, F.R.P.S., Founder of *The Photographic Monthly.*

About Steel-Etching.

Notes by "M."

FOR the machine-printed photogravure, copper plates are not suitable because they are too soft; a steel plate, on the contrary, fulfils all requirements. This is generally acknowledged in connection with the machine-printing of line-engravings, which must be from steel.

For commercial printing and also for better-class picture post cards, machine printing is being largely used, especially abroad. To produce this work one needs a clean-edge, deep-etched plate. Many industries have a real need for good deep etching, and have now no satisfactory method.

Further, it is well known that when something out of the ordinary is demanded of them, the printers are mostly at a loss. They try first to persuade the customer to allow his deep etching in copper or brass to be exported, and when all persuasive art fails, refuse the order altogether, because invincible difficulties are expected in its execution.

Yet there is scarcely anything simpler than line etching in steel. The treatment is almost exactly the same as in copper deep-etching. First, a positive transparency is necessary, which is best made upon a wet plate giving a strong, sharp image. For the sensitising of the steel plate, the same must be first thoroughly cleaned and every vestige of grease removed by treatment with soda solution or diluted ammonia. Since the chromated glue solution does not hold so well upon steel as upon copper, we may roughen the steel plate by laying it in a bath of vinegar and sulphuric acid, or a mixture of one part water-glass and five parts water, or one may cover the steel plate with a very thin copper skin by simply laying it in a weak copper solution. I found by trial that the laying of the plate in a mixture of ammonia and alcohol roughened it sufficiently, and that with the best enamel formulated no roughening is necessary.

For the resist, any formula suitable for copper plate may be used. Chromated albumen as used in zinc-etching has been successful, though one must proceed very carefully with the choice of the etching solution, otherwise the albumen coating will float off in the etch-bath. Chrome-gelatine and chromated-gum do not give so good a resist as chromated fish-glue mixed with albumen in suitable proportions. The asphaltum solution may be employed with advantage where very strong light (for example, sunlight) is for disposal, and time is not so important as sure and satisfactory results.

A very useful method is the "Heliographische Gravierung," by Charles Negre. The steel plate is first covered with asphaltum or chromated gelatine, then copied under the line negative, developed, dried, and then electro-gilded. After removal of the sensitive coating the plate can be etched, because the extremely thin gold plating resists the acid.

Over the appropriate dilution for the acid bath opinions vary greatly. By one trial I found 40 degrees iron chloride solution very sufficient; also Barth's etching bath of five parts of glacial acetic acid and one part of nitric acid is very good. This last prescription works with more than ordinary speed.

For those who do not like chloride of iron or Barth's prescription, I give the following from William Gamble's newest book:—Iodine, 2 parts; iodide of potassium, 5 parts; water, 40 parts. For the etching of the finest lines the solution thus strongly dilute wants doubling. With this bath one can produce a deep strong-angled plate.

A prescription suitable for use with an asphaltum resist is:—Nitric acid, 1 part; distilled water, 8 parts; alcohol, 2 parts. At the conclusion of the etching, nitric acid and water only, without alcohol, should be employed.

Next a bath of nitric acid and water (1-8) should be used, and finally a bath containing copper nitrate, or sublimate, or silver nitrate, is cited. I can guarantee that I have tested and proved all the prescriptions quoted.

Perhaps the reader will be interested in yet another table where, in a compact form, different prescriptions are arranged, which are contained in Albert's *Technischem Fuhrer durch die Reproductionsfahren.*

STEEL ETCHING BATHS.

Nitric Acid. c.cm.	Water. c.cm.	Acetic Acid. c.cm.	Alcohol. c.cm.	Hydrochloric Acid. c.cm.	Nitrate of Silver. gm.	Oxalic Acid. gm.	Mercury Bichloride. gm.
1	4-30						
1	4-30	1					
1	...	1-4	1-4				
1	4-30	1					
1	...	...	1-5	...	1		
60	120	...	120	...	...	1	
50	130	...	60	4	...	...	0·1

Also:—Sulphuric acid, 1 part; water, 30; *plus* hydrochloric acid, 1 part; water, 30.

—Translated from *Zeitschrift für Reproduktionstechnik.*

Max Levy on Machine-Printed Photogravure.

THE facts that one of the important secrets of success in machine-printed photogravure is the employment of the proper "screen," and that Max Levy makes special screens for this kind of work, lend a special interest to a few notes which Mr. Levy communicated to *The Inland Printer* recently. In answer to a request for technical details on the screen side of the problem, Mr. Levy refers us to the notes in question, saying that he has no useful particulars to add; wherefore, we reprint them, as follow:

"Undoubtedly one of the most interesting developments in photo reproduction at present in sight is the process mentioned above. The work of the English company has been before us for some ten years, and the prints that have emanated from this source have aroused great admiration on account of their extreme delicacy and the depth of shadow characteristic of the work.

"Notwithstanding the length of time that this class of work has been before us, we have not yet attained any general dissemination of knowledge relating to the practical details of the procedure.

"The process is extremely interesting from many points of view, but in its present state its application must be rather limited by the nature of the process employed for printing, although this is extremely rapid. I presume that many of our craft are still quite unfamiliar with the nature of the process, and hope that a brief general description may be acceptable.

"The process may be said to be a combination of the photogravure and the calico processes, the plate being analogous to the photogravure plate, and the method of printing similar to that employed on textiles, excepting that the color as printed is final and does not require to be fixed. The procedure is about as follows:

"A screen is employed (usually about 150 lines to the inch), consisting of very thin, transparent cross lines on an opaque ground,* and an ordinary positive is used. The screen itself is first printed on a piece of gelatin tissue, such as is used in carbon printing, and next the negative is printed on the same tissue. The tissue then, containing the print from the screen and that from the negative, is moistened in cold water and transferred by means of a squeegee to a copper roller, which has been turned accurately true. The design is now etched into the copper roller with perchloride of iron, by what is known as the 'staging process,' as employed in producing a photogravure plate. This procedure consists first in washing off the paper, upon which the gelatin was coated, with water.

"Now, if the copper covered with the gelatin is immersed in an absolutely saturated solution of perchloride of iron, there being no free water to penetrate the gelatin, no etching will take place. If a few drops of water are added, the etching will be noticed to proceed through the least exposed portions of the gelatin. By slowly adding the water, the etching will gradually proceed until the more exposed portions have been attacked. When this etching is completed (and the procedure can be watched through the transparent gelatin) the gelatin is removed from the roll and the design appears on the copper in the shape of little squares conforming in shape and size to the opaque parts of the screen, but varying in depth in proportion to the action of the solvent. A positive having been used, the shadows which were least exposed will show the squares most deeply etched, while the high-lights will show the metal either perfectly flat or very slightly etched in squares of the same size as those in the shadows.

"The ink is special, and I am not posted as to its composition and character, excepting that it is very thin and liquid, and is applied to the roll in a mass. As the roll revolves, the paper is fed through the press as muslin is for printing, in a continuous roll, and the printing proceeds at the rate of five or six thousand impressions an hour.

"There are quite a number of different concerns at work upon the process in different parts of the world, and the probability is that within the next few years we shall see material developments along this line. Unfortunately, it seems in the present state of the art impracticable to print from flat plates, owing to the nature of the method of removing the superfluous ink from the surface."

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* A further note on this point, with illustration, next month.—Ed.

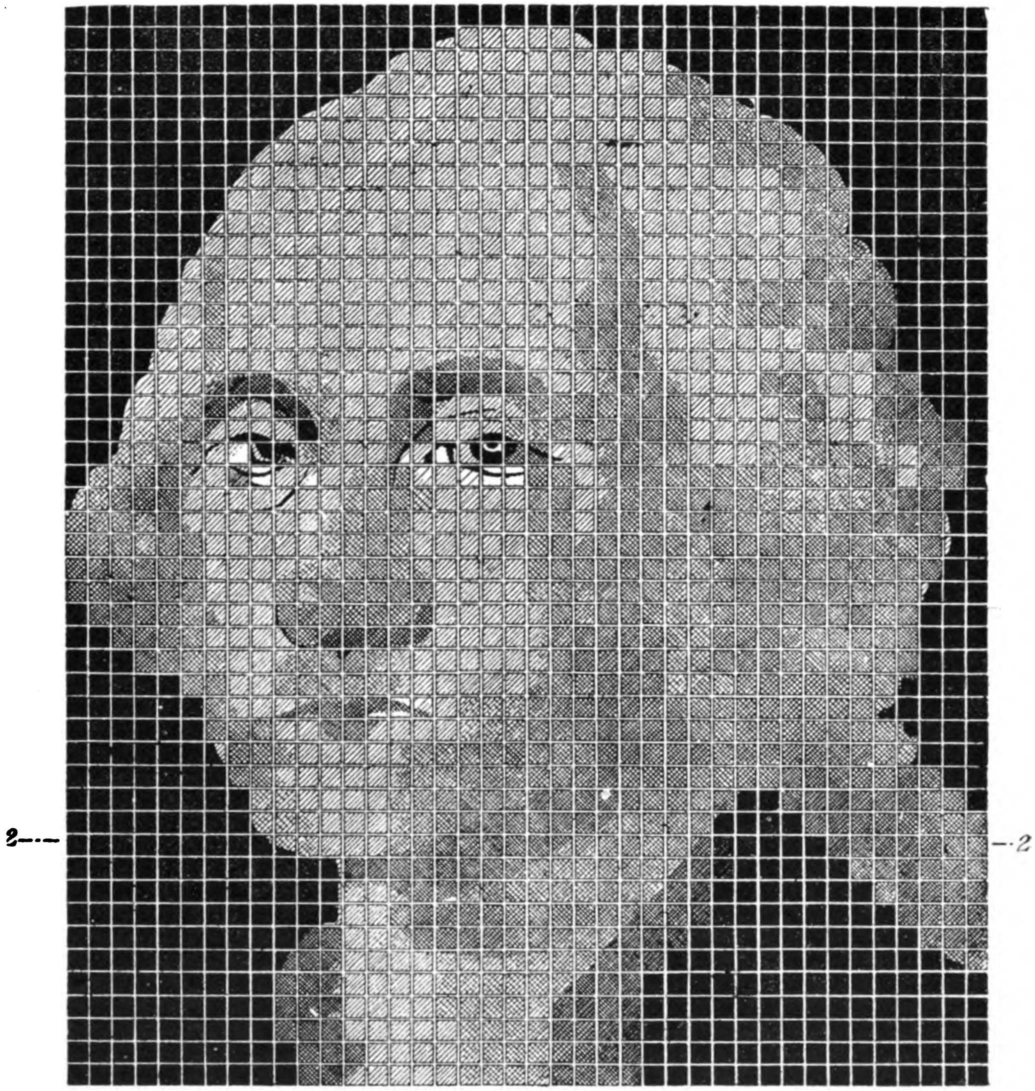

Fig: 1

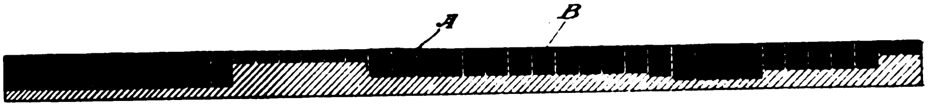

Fig: 2

THE SAALBURG PATENT, NO. 935,612 OF 1909.

Illustrations referred to in the description commencing on opposite page.

Machine Printed Photogravure: The Saalburg Process.

THE process which has been under the fostering care of the Van Dyck Gravure Company of New York for many years, and which is now achieving great commercial results, seems destined to play a very important part in the world of illustration in the next few years. It has been fully demonstrated that it is practical, economical, and thoroughly commercial in every way. The best proof of this is in the two facts: (*a*) that large orders have been and are being executed for advertising, book-publishing and print-publishing concerns, at prices that compete with good color-litho; and (*b*) that prints made by this process are being sold in the art stores at good prices as individual pictures. Great quantities of calendar and other advertising prints have been produced for the business of next Christmas, and some very big orders for illustrated booklets, in which the text is printed by photogravure, with the illustrations, are passing through the house.

While Mr. Saalburg has a host of questions yet unsolved, and is working assiduously to perfect the process still further, the real difficulties lying before the company are commercial ones. There is no lack of capital, but there is a dearth of men, both for the actual production of the work that is now on order and for the proper expansion of the concern, both in the United States and in other lands. There are machines to be built, workmen to be trained, and all the negotiations that come from the old countries to be dealt with, so that it promises to be a long time before the concern reaches a normal condition, where expansion may cease for a while, and all energies be directed to filling orders.

There will be more to say about the process from time to time. A most interesting specimen will appear in our pages as a supplement next month, and will be followed by others at intervals. When ordering them we stipulated that they should not be printed as "specimens," but should be parts of orders actually worked for customers, and should be from *the end of the run*. As many of the jobs are much too large for our page, and as many publishers of the prints raise objections to their source being publicly stated, there may be some delay in obtaining what we want. We hope, however, in several early issues to show the sort of prints that can be obtained under ordinary working conditions, at the ends of long runs from the plates. These will be both in monochrome and in color, and the speed at which they are worked will be stated. Meanwhile, great interest will be taken in Saalburg's patent.

Mr. Saalburg modestly, and somewhat vaguely, entitles his claim, "Process for making pictures." Slightly condensed, the patent (No. 923,799 of 1909) reads:—

"The object of my invention has been to produce a picture which shall be especially adapted to be manufactured by printing, and especially such a picture having a high degree of artistic merit; and to such ends my invention consists in the process of making the same hereinafter described.

"As my picture will be best understood by describing one process of making the same, I shall first describe such a process.

"In the accompanying drawing fig. 1 is a plan view of a plate adapted for printing my said picture according to my said process; and fig. 2 is a section taken on the line 2—2 of fig. 1.

"The process is capable of embodiment in a number of forms, and a specific example is only to be regarded as an illustration of the inventive idea.

"As the highest form of the picture and of the process are illustrated in the polychrome, I shall describe such a picture and the process of making it, but my invention also includes the process of making a picture in monochrome.

"In the making of a picture I make a negative or negatives direct from the picture to be reproduced. In color work I ordinarily make one negative of the blacks and whites, and the three usual primary color negatives through color screens. I next make a positive from each of the said negatives, and preferably do any necessary retouching upon the positives. So far, no devices for breaking the surface into printing divisions have been used. Next, ordinary commercial carbon paper is sensitised and squeegeed on a smooth surface, such as a glass plate. I preferably cut a single sheet of carbon paper large enough to cover all four positives at the same time. I also preferably cut the paper so that the length of the paper in the strip runs the long way of the positives. This paper is sensitised, and all operations performed on it at the same time, so as to keep the stretch and shrinkage the same throughout. This working upon the four prints as a single print insures that the conditions under which each print is sensitised, developed, etc., shall be identically the same, so that the stretch and shrinkage (which are large enough to prevent perfect register of the superposed color impressions if they are not properly cared for) shall be the same on each print, and thus do no harm.

"The sensitised carbon paper is exposed under a line screen, preferably one quarter of the time which it will require under the positives. The screens* referred to are the usual glass screens ruled with parallel lines. After the paper has been exposed under the screens with the lines running in one direction, the screens are turned at right angles, to print lines running in a corresponding direction, and the paper again exposed for about one quarter the exposure to be given under the positives. After the screen lines have been printed, the paper is exposed under all four positives at a single time, thus making all four negatives. Before placing the positives on the paper, lines are carefully drawn at a given distance from the margin of each positive. The exposed carbon paper is then squeegeed on a carefully cleaned copper roller, the aforesaid lines being used to position the paper on the roller, so that the horizontal axis of the picture shall be exactly parallel to the axis of the cylinder. Blotters are pressed around the cylinder by inclosing them in a cover in the form of the sheet and drawing the cover up around the cylinder as by straps and buckles, the cover being substantially like an ordinary shawl strap in practice. . After the film has had time to take a good hold of the cylinder, the cover is removed, and very hot water is applied to the cylinder to loosen the paper, and the paper is stripped off, leaving the gelatine film of the carbon paper adhering to the cylinder. The exposed portions of the carbon film have had their bichromate of potash rendered insoluble by the action of the light, while the remaining portions of the gelatine are soluble. By the application of hot water, the soluble gelatine is washed off, leaving the negative of the picture on the cylinder in gelatine. The cylinder is now ready for etching, except that the portions of the cylinder which it is desired to protect from the etching fluid are to be covered with asphaltum. The cylinder is etched in the usual manner in which photogravure plates are etched, and the positive of the picture is thus sunk into the cylinder, but is by the screen lines divided up into rectangular cells. These cells are of varying depths, according as they are under the high-lights, or shadows, or intermediate tones of the picture. The action of the light on the bichromatised gelatine, followed by the washing with hot water, leaves a film on the surface to be etched, which is of varying degrees of permeability, being less permeable over the screen lines and the high-lights of the picture than over the darker portions. The etching agent, then, striking through the film more quickly at the darker portions of the picture, eats away the metal before the agent can penetrate through the less permeable portions of the film over the screen lines and the high lights. No 'resist,' however, is used, and if the etching action were permitted to continue long enough, the etching agent would strike through and etch the screen lines and the high-lights. It is by stopping the etching action at the right point to preserve the screen lines and high-lights, while giving time enough to etch the darker portions, that the proper effect is obtained. The film is not hardened to produce a 'resist.' The cells preferably cover a much larger portion of the area of the cylinder than do the screen lines. The gelatine is then removed from the cylinder, and the cylinder is ready for printing.

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* For modification of this statement in actual practice, see Max Levy's little article, p. 98.—Ed.

"The cylinder is placed in a rotary printing press, such, for instance, as that illustrated in the application of Charles Van Middlesworth, Serial No. 464,096, filed November 23, 1908.* In printing the picture, ink is mechanically applied to the cylinder in a sufficient quantity to fill all the cells between the screen lines. The ink is then scraped off by the revolution of the cylinder against a preferably sharp steel blade, which fits closely against the cylinder, and which is preferably moved back and forth across the face of the cylinder in a direction parallel to the axis of the cylinder, the length of the blade running parallel to the said axis.

"An ink which I find very effective for my purpose is one which is the subject of an application for patent executed by me the 7th day of November 1908, Serial No. 464,192,† filed November 23, 1908, to which reference is made. The scraper or 'doctor' removes the ink from the surface of the cylinder wherever such surface remains, namely, from all the screen lines and from all the blank portions of the cylinder which are to represent white in the picture, and the white margin around the cylinder, and this operation leaves the cells between the screen lines filled with ink.

"In the accompanying drawings the formation of the printing surface is illustrated as applied to a plate. The metal which was protected by the screen lines is not eaten away and forms a series of rectilinear walls A, which, crossing each other, form inclosed wells B. The wells B are of varying depths, according to the depth of color to be reproduced, although in the illustrated embodiment they are of uniform area. It is not essential that the area of the ink wells be uniform, but only that they be sufficiently large so that the walls between them may be of sufficient thickness to prevent their being eaten away and undercut by the etching fluid. In other words, the walls between the wells must be of sufficient thickness so that the wells can be etched deep enough to hold a sufficient quantity of ink to make the desired result, especially when this ink is thin enough not to be dragged out of the wells in scraping the plate.

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* This is not yet published, and appears not to have been completed.—Ed.

† Not published yet.—Ed.

"As it is exceedingly difficult to perfectly clean the surface of the cylinder outside of the picture where it is desired to have the paper in its natural condition, and without having any ink on it, I have invented the expedient of covering the impression cylinder with paper, and then making the press revolve the cylinder once so that the picture is printed on the said paper covering. I then cut away all the covering outside of the picture where it is desired to leave the paper clean upon which the picture is to be printed, thus leaving a relief or raised surface on the impression cylinder exactly corresponding to the picture, but not extending beyond it, and, in fact, depressing or removing the remaining portions of the impression cylinder surface. In this manner, when the printing takes place, the paper on which the picture is to be printed is not pressed against the portions of the surface of the printing cylinder which are not engraved, and thus any slight film of ink which may remain there is not transferred to the paper. In order that the impression and printing cylinders may not come in contact where they are not held apart by the portion of the covering of the impression cylinder corresponding to the picture, I preferably leave or form a ring on each end of the impression cylinder, which is of substantially the same height as the said paper covering, so that the said rings will sustain the printing cylinder when it is passing over portions of the impression cylinder not having the height of the said retained portion of the paper covering. The impression cylinder is twice the diameter of the printing cylinder, so that the printing cylinder can have the two said revolutions between each printing operation. By the use of the said arrangement of cylinders and the said ink, I find that a single color can be printed upon a dry sheet of paper of dull or matte surface at a high rate of speed, so that many hundreds of such impressions can be made in a single day. It is not necessary to dampen the paper, nor to heat the cylinder, and it is not necessary to rub the cylinder off by hand or with a cloth as heretofore. The 'doctor' does not injure the surface of the cylinder, and the cylinder thus has a very long life. In printing a polychrome picture, the several impressions, all made preferably from etched cylinders as above described, are superimposed one upon another in the usual order of such printing. Of course, it is obvious that the same effect could be produced by etching a plate instead of a cylinder, and that the said plate could be wiped off instead of scraped clean.

"The nature of my picture can now be understood. Each cell in the etched cylinder deposits its ink upon the paper like an inverted cup, so that the ink is piled up in relief upon the paper. It is entirely different from printing where the plate is etched away around the points which are to print upon the paper, for in the latter case a film of ink is deposited upon a plane surface, and that surface crushes the ink into the paper, and often forms a depression in the paper where the imprint is made. With my picture, however, the paper is not depressed where the ink is deposited, but the ink is deposited on the surface of the paper and piled up thereon (where the color is heavy), and the impression of the printing surface on the paper tends to increase rather than decrease such relief, for the screen lines, which in my printing surface are in relief and do not carry ink, tend to depress the paper around the portions which receive the ink. The entire surface of my picture is covered with ink, except only that the surface is crossed by the screen lines. Every portion of the imprint of my picture, except the pure whites, is covered by complete rectangles of ink. The differences in shade are not obtained by making the rectangles larger or smaller, or more or less complete, but they are obtained by the differences in depths of the cells, and consequently the differences in thickness of the deposit of ink. It is in precisely the same way that differences in color are produced in a pastel. In a pastel the color is put on in varying thicknesses, according to the depth of color desired. On the contrary, with a half-tone engraving the different degrees of color are obtained by making the dots of color which are printed larger or smaller, and often of different shapes. In my picture the entire paper is fully covered with ink, except for the screen lines, but the ink is of varying degrees of thickness. In a half-tone, on the other hand, the ink is of uniform thickness wherever it appears, but the natural surface of the paper is left uncovered where it is desired to produce a lighter effect. This, as before stated, is owing to making the dots of color of larger or smaller area. In other words, the engraving in the surface of my cylinder is a cast of the picture to be produced, while with half-tones the engraving is never filled with ink, the ink being applied only to the portions of the original surface which still remain, so that the engraving represents the white portions of the picture. In my picture, the picture is made up by ink running from transparency to opacity, while with all other printed pictures the picture is made up by dots or isolated specks of ink of different sizes. In my picture the effect is produced in an ideal way of varying the densities of the ink as an artist would do by hand. With my picture the effect of the lighter tones is produced by the white of the paper showing through the ink, something in the same way as the light shows through a stained glass window. This is a highly artistic effect. My picture can be printed on soft paper, while a half-tone must be printed on paper having a hard surface, to prevent the ink from sinking in and separating and covering the little white interstices between the specks of ink. This piling up of the ink in effect produces the rich velvety appearance so much prized in etchings or in intaglio engravings. The reproduction of pastels by my process produces a picture remarkably like the pastel in appearance. As my colors are printed in varying degrees of thickness, the lower colors shine through the upper colors, and thus combine the colors, because they are transparent, while the usual colors do not combine in this way.

" With half-tone work, great care has to be taken to place the screen lines of the successive colors at angles where they will not produce objectionable patterns, or a plaid effect, and much difficulty and expense are involved in producing this kind of work to avoid this objectionable effect. With my process I need pay no attention to the angle of the screen lines, but can print the screen lines of the successive pictures all in substantially the same direction, and without care, as no pattern effect is produced under any circumstances. I suppose this to be due to the fact that the screen lines are but a small portion of the entire area of my picture, while with the half-tones they form a considerable portion of the lighter portions of the picture.

"I preferably print upon sheets of paper instead of upon paper in a roll, and position the sheet for each of the superimposed impressions by placing it against gauges. Paper in a roll will stretch so as to prevent perfect registry of one impression upon another, as its length changes under different conditions of humidity, tension, electricity, pressure, etc. By the use of sheets these objections are eliminated, and I obtain perfect registry.

"The picture which I have described herein is not claimed in the present application, but is the subject of another application for patent, Serial No. 488,405, filed Apr. 7, 1909 (see p. 108.—Ed.).

"I claim:—

"1. The process of producing an intaglio printing plate, which consists in subjecting a surface having a light-sensitive coating to the action of light through a line screen, printing from a positive on the said surface, developing the image produced without hardening the light-sensitive coating, and then etching the surface so treated, thereby producing relatively large color-receiving cavities of uniform area and varying depth, according to the depth of color desired.

"2. The process of printing pictures, comprising forming a carbon tissue negative of the picture to be reproduced, which negative is crossed by screen lines, transferring said tissue to a plate and etching said plate, developing the image produced without hardening the light-sensitive coating, the depth of the various portions varying according to the depth of color desired, and then filling the cavities thus formed with ink, removing the ink from the screen lines and high portions of the plate, and printing the picture.

"3. The process of printing pictures, consisting in forming an intaglio positive in a printing surface, said positive being divided into small cavities of substantially equal area by walls corresponding to the screen lines, the depths of said cavities varying, according to the depth of color desired, filling said cavities with ink, removing the ink from said walls, and printing.

"4. The process of printing multicolor pictures, comprising etching intaglio positives, one for each color to be printed, said positives being broken up into cells of uniform area by screen lines, the depth of said cells varying according to the depth of color desired, filling each of said positives with its respective color, removing the ink from said screen lines and the high portions of the printing surface, leaving said cells filled with ink, and printing, first one color and then another, the colors being superimposed upon each other.

"5. The process of printing pictures, which comprises forming an intaglio printing surface for each of the several colors to be printed, said intaglio surface being broken up into ink-receiving wells of considerable area and of depth varying according to the depth of color desired, filling said printing surfaces with thin ink of the proper color, scraping the surplus ink from the surfaces of said plates, and superimposing said colors upon a sheet of paper.

"6. The process of printing a picture, comprising forming an intaglio printing surface divided into cells of uniform area, the depths of said cells varying according to the depth of color desired, applying ink to said surface, removing the ink from the unetched portions of said printing surface while leaving the ink in said cells, and impressing said printing surface upon dry paper.

"7. The process of printing pictures, comprising forming an intaglio printing surface having large ink-receiving wells separated by continuous walls, said wells being of varying depth, according to the depth of color required, filling said intaglio with thin ink, removing the excess, and printing from said surface while cold.

"8. The process of printing pictures upon dry paper, comprising forming an intaglio printing surface, said surface consisting of relatively large ink-receiving wells separated by continuous walls, said wells varying in depth, according to the depth of color desired, filling said intaglio with ink, removing the excess, and printing from said surface while cold, said impression being made upon dry paper."

We understand that the European rights in the Saalburg patents will be offered for sale or lease, as the Van Dyck Company realises that the American field is large enough to employ the full energies of a great organisation for many years to come. While the preamble of the patent states that it is a full, clear and exact statement of the methods, there is no doubt that, in addition to the protection afforded by the patent, the proprietors can give much useful help in overcoming the many technical difficulties incident to the preparation and printing of their plates, which are not peculiar to the patented method of working but which affect its success very materially.

The patent above quoted states that it describes what is claimed in another patent, which is quoted in the following pages. It also refers to patents on printing machinery and inks. These we hope to publish as they are issued by the Patent Office, thus making clear the exact nature and extent of the claims.

THE IVES TRIPAK system of color photography, which ought to be on the market within the next few months, promises important developments for the process man. It is a three-plate system, but is worked with one exposure, through one lens, in a camera that is exceedingly simple, and should be inexpensive. The plates are supplied in little packs of three that can be inserted in the special plate-holder as easily as a single plate. The exposure is, at present, about the same as for an Autochrome, but should be materially shortened almost at once by the plate-maker. The pack is placed in a developing holder, and the three plates are developed simultaneously in a tank. The three negatives are printed together on a transparent tissue consisting of bichromated fish-glue on collodion, and are developed in cold water; the prints are cut apart with scissors, are dyed in three dye-baths, superimposed and bound between glasses, either with or without balsam cementing. The method is the Ives Kromskop triple method, simplified very greatly. The making of the negatives takes the same time as the making of an ordinary monochrome negative, plus a somewhat longer exposure. The printing is very quick and easy—we have seen a triple print made and finished well within twenty minutes. The difficulties of stretching and failure to register appear to have been overcome perfectly.

The importance of the Tripak method for the process man lies in the fact that it places in the hands of the amateur a process as simple as Autochromy, one that provides for any number of color transparencies, and one that is eminently suitable for having its results reproduced by trichromatic printing. Many of the more serious tourists should carry their Tripak in addition to their ordinary camera, so that they can illustrate their journeys in color with the lantern. The thousands of travel-books that are now being illustrated in half-tone should eventually be illustrated in color by working from Tripak negatives, and this will be easy with the Tripak transparency as guide for the fine-etcher.

Another Saalburg Patent for Machine-Printed Photogravure.

The importance of machine-printed photogravure warrants the publication of the essential parts of the two Saalburg patents, each of which purports to describe the method claimed in the other, even though they cover the same ground to a very great extent. It is necessary to know exactly what is claimed.—Ed.

My picture will be best understood by describing one process of making the same (Patent No. 935,612 of 1909).

In the accompanying drawings fig. 1 is a plan view of a plate for printing according to my process; and fig. 2 is a section on the line 2—2 of fig. 1 (see p. 100).

As the picture is best illustrated in the polychrome, I shall describe such picture and process of making it, but my invention also includes a picture in monochrome. The process described herein is not claimed in the present application, but is the subject of a patent granted to me June 1st, 1909, No. 923,799. Reference is made to the said patent for the details of the process of making my said picture.

In the accompanying drawings, the formation of the printing surface by which my picture is printed is illustrated as applied to a plate. The metal which was protected is not eaten away, and forms a series of rectilinear walls A, which, crossing each other, form inclosed wells B. The wells B are of varying depths, according to the depth of color to be reproduced, and are of uniform area. It is essential that the areas of ink making up the picture be of uniformly large size so that they shall all be sufficiently large to permit the ink to be piled up on them to a sufficient height to produce the color effect desired.

In printing the picture, ink is mechanically applied to the printing plate in a sufficient quantity to fill all the cells. The ink is then scraped off by a preferably sharp steel blade, which fits closely against the plate. An ink which I find very effective for my purpose is one which is the subject of an application for patent executed by me on the 7th day of November 1908, Serial No. 464,192, filed November 23, 1908, to which reference is made.* The scraper or "doctor" removes the ink from the printing surface wherever such surface remains, namely, from all the screen lines and from all the blank portions of the cylinder which are to represent white in the picture, and the white margin around the printing surface, and this operation leaves the cells or pockets between the walls "A" completely filled with ink. In printing a polychrome picture the several impressions of primary colors, each made from a separate printing plate or cylinder, are superimposed one upon another in the usual order of such printing.

The nature of my picture can now be understood. Each cell in the etched plate deposits its ink upon the paper like an inverted cup, so that the ink is piled up in relief upon the paper. It is entirely different from printing where the plate is etched away around the points which are to print upon the paper, for in the latter case a film of ink is deposited upon a plane surface, and that surface crushes the ink into the paper, and often forms a depression in the paper where the imprint is made. With my picture, however, the paper is not depressed where the ink is deposited, but the ink is deposited on the surface of the paper and piled up thereon (where the color is heavy), and the impression of the printing surface on the paper tends to increase rather than decrease such relief, for the walls A, which in my printing surface are in relief and do not carry any ink, tend to depress the paper around the portions which receive the ink. The areas of ink are separated only by spaces which are in the form of relatively uniform lines, so that almost the entire area of my picture is covered with ink. The differences in shade are not obtained by making the rectangles larger or smaller, or more or less complete, but they are obtained by the differences in depths of the cells, and consequently the differences in thickness of the deposit of ink. It is in precisely the same way that differences in color are produced in a pastel. In a pastel the color is put on in varying thicknesses, according to the depth of color desired. On the contrary, with a half-tone engraving, the different degrees of color are obtained by making the dots of color which are printed larger or smaller, and often of different shapes. In my picture the entire paper is fully covered with ink, except for the narrow lines of separation between the ink areas, but the ink is of varying degrees of thickness. In a half-tone, on the other hand, the ink is of uniform thickness wherever it appears, but the natural surface of the paper is left uncovered where it is desired to produce a lighter effect. This, as before stated, is owing to making the dots of color of larger or smaller area. In other words, the engraving in the surface of my printing plate is a cast of the picture to be produced, while with half-tones, the engraving is never filled with ink, the ink being applied only to the portions of the original surface which still remain, so that the engraving represents the white portions of the picture. In my picture the picture is made up by ink running from transparency to opacity, while with all other printed pictures the picture is made up by dots or isolated specks of ink of different sizes. In my picture the effect is produced in an ideal way of varying the depths of the ink as an artist would do by hand, while in all other printed pictures the effect is produced by ink areas of equal depth and varying sizes. With my picture, the effect of the lighter tones is produced by the white of the paper showing through the ink, something in the same way as the light shows through a stained glass window. This is a highly artistic effect. My picture can be printed on soft paper, while a half-tone must be printed on paper having a hard surface, to prevent the ink from sinking in and separating and covering the little white interstices between the specks of ink. This piling up of the ink in effect produces the rich velvety appearance so much prized in etchings or in intaglio engravings, and is a result never obtained before, so far as I know, prior to my invention, either in monochrome or polychrome automatic printing. The reproduction of pictures by my process produces a picture remarkably like the pastel in appearance.

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* See note on page 103.

As my colors are printed in varying degrees of thickness, the lower colors shine through the upper colors, and thus combine the colors, because they are transparent, while the usual colors do not combine in this way.

I claim:—

1. A picture comprising a large number of small color areas of uniform size but of different depths.

2. A picture comprising a number of small color areas of substantially equal size having the ink piled up in relief thereon.

3. A printed picture comprising a large number of small areas of substantially equal size and having inks of several colors on such areas and of different depths, according to the effect to be produced.

Fill-up Jobs at Cut Prices.

A, B and C have all the trade in a certain territory, at fair prices, and each has out of 90 days 30 days of idle time, that is, each could do one-third more work than he is doing.

	Days
Time in 90-day period, each office 60 days	180
Idle time in 90-day period, each office 30 days	90
	270

A thinks half a loaf is better than no bread, and takes some fillers which must come from B and C, 15 days from each, making—

	Days
A's time, working	90
B's time, working	45
B's time, idle	45
C's time, working	45
C's time, idle	45
	270

B, now having so much idle time, has to make inroads on the others' good paying work, at filler prices, taking 15 days from each A and C, and at the end of the period we have—

	Days
A working	75
A idle	15
B working	75
B idle	15
C working	30
C idle	60
	270

C cannot stand this, so he has to cut A and B's prices on such good work as they have, with similar results, and we have—

	Days.
A working	60
A idle	30
B working	60
B idle	30
C working	60
C idle	30
	270

This brings us back to just where we started, but with this difference: A originally had 60 days' work at good prices, to which he added 30 days' work at low prices taken from B and C. B had the same, and made the same changes, and C did the same. Each now has 30 days of good work and 30 days of cheap, and all are worse off than in the beginning. Continue this on the same basis for some time, and where do we come out? There will be no profitable work.—DAVID RAMALEY, in *The Pacific Printer.*

PROCESS THE HANDMAID OF ART.—Mr. Wm. Gamble, lecturing before the Bradford and District Master Printers' Association, said:—"I think I have said sufficient to show you that illustrating processes are developing rapidly and wonderfully, and the newspaper of the future will be of great pictorial interest, whilst our weekly periodicals, monthly magazines and cheap books will be illustrated still more profusely than at present with attractive pictures. Our art books will be works of wonderful beauty and artistic accomplishment. The artist and the photo-engraver will be found working hand in hand to reproduce Nature's forms with more and more realism and skill, transcending anything we have seen up to the present. The barrier which at present seems to often exist between the artist and the photo-engraver will be broken down, and the photo-mechanical process in whatever form it might be worked will be recognised as truly the handmaid of art."

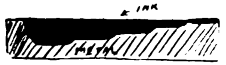
The Theory of Hand and Machine Etching.

By A. J. Newton, Principal of the Bolt Court School.

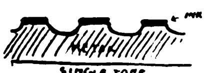
√A paper read at the Royal Photographic Society.

I PROPOSE only to deal with photo-mechanical etching, and that only in the usually practised methods.

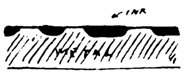
Etching is usually spoken of as relief etching: that is, when the surface of the plate that is not etched carries the ink and is printed from, the etched-out hollows providing the whites, or intaglio etching, *i.e.* when the etched-out hollows hold the ink and are printed from, the surface that is unetched being wiped and providing the whites. While this is a convenient classification as far as regards the printing, it is not at all distinctive as regards the etching, which might perhaps better be divided into a single-tone system and a multiple-tone system, the single-tone system being that in which the effect is entirely produced by the same thickness of ink everywhere, giving only one thickness of ink and white paper as in ordinary line and half-tone work. Notice this is true for relief or intaglio; intaglio line or half-tone is only the negative of the surface method, a positive transparency being used to print from, instead of a negative. The multiple-tone system is that in which the tones are produced by layers of ink of several thicknesses, as in photogravure as ordinarily printed. Inverted photogravure, that is, relief work made in the photogravure method, is simply a single-tone method, as, although half-tones are well rendered, this is not due to different thicknesses of ink, but to the degree of the removal of portions of the bitumen or resin grain ground.



MULTIPLE TONE
(INTAGLIO)



SINGLE TONE
(RELIEF)



SINGLE TONE
(INTAGLIO)

Now the metals usually used are copper and zinc. Copper is exclusively used for photogravure, and in England almost exclusively for half-tone work, while for ordinary black and white line work, that is, work without any cross-line screen, zinc is almost universal: on the Continent zinc is almost entirely used for both line and half-tone.

With regard to these metals I need not go into the sources or nature of zinc, except to state that little appears to have been done to determine the particular impurities, without which zinc would not etch at all, that are most desirable in the zinc, and the right proportions of such impurities.

Novak has published some analyses of various commercial samples, all of which samples he found suitable when they had not to be heated first. But the hot enamel process of making typographic blocks entails the heating of the insoluble fish-glue until it has become carbonised, and in doing this the zinc becomes crystalline and very fragile, thus rendering it more or less unsuitable for the subsequent operations of etching and printing.

The following are the results of two of these analyses:—

	No. 1. Per cent.	No. 2. Per cent.
Lead - -	1·6	1·23
Cadmium -	0·209	0·072
Iron - -	1·0298	0·0117
Arsenic - -	Trace	Trace

Sample No. 1 seemed suitable for all kinds of work, but No. 2 did not give good results with the hot enamel process. Thus zinc with a greater percentage of cadmium is preferable for the hot process, and lead is not so detrimental to the quality of the plate as many have asserted.

A good deal of trouble is often caused by the want of adhesion of the enamel film in the etching bath: this is presumed to be due to the crystallisation of the zinc caused by heating. Investigation is required as to the cause of this, as to whether it varies with the same resist on different samples of zinc. Tschörner has investigated the matter with regard to various qualities of resist, and concludes that certain resists and resists hardened or tanned after exposure withstand the acid better than others. This hardening appears to have the effect of adding to the elasticity of the resist: at all events, after this treatment it does not tend to come off so readily.

The advantages of copper are its high melting point, 1100° C., its durability, its practical freedom from corrosion in air, and above all, the fact that it retains its enamel film well and etches easily.

Copper properly deposited electrolytically on a smooth surface in sheets ready for etching would appear to be a more satisfactory metal to use than the copper usually supplied in sheets which have been rolled. I cannot speak positively as to this, as I have only tried one small sample supplied to me by Mr. J. A. Corey, of Messrs. Eyre & Spottiswoode, but certainly that etched quicker than the ordinary copper against which we tested it. Yet Mr. Corey tells me that it is a harder copper as far as frictional wear is concerned, for his firm find that the wear on an original half-tone block is greater than on the electrotype taken from the same block, both of them printed side by side. Of course I am only speaking of copper properly deposited with this end in view.

The actual mordants used are confined to two, viz., nitric acid for zinc and perchloride of iron for copper, and the advent of the etching machine has not so far caused any alteration to be suggested.

The usual reactions are given as follow:—

For copper and iron perchloride:

$$Cu + Fe_2Cl_6 = CuCl_2 + 2FeCl_2.$$

Copper + iron perchloride.
Cupric chloride + ferrous chloride.

The reaction products, so far as I have been able to observe, even in absolutely exhausted solutions, are completely soluble.

In calculating what happens with iron perchloride, especially in weak solutions, it must not be forgotten that hydrolysis occurs.

The chemical reaction taking place when dilute nitric acid attacks zinc is that the zinc is dissolved as nitrate with evolution of nitrous oxide, N_2O; but the action of nitric acid is very complicated. Professor Ramsey says that using zinc or magnesium and very dilute acid, nitrous oxide, nitrogen and hydrogen, and ammonium nitrate are the main products. To quote another authority, "its action on metals seems to be dependent on the presence of nitrous acid, for when the acid is freed from nitrous acid, its action on metals is extremely slow, and its rate of action increases with increase in amount of nitrous acid. The nitrous acid seems to arise in the first place from electrolytic action set up between the metal and traces of impurities contained in it. The nitrous acid forms a nitrite of the metal and the nitrite is decomposed by the nitric acid.

"In general, when nitric acid acts on metals a nitrate is produced and reduction products of the acid which vary with the nature of the metal, concentration of acid, and temperature. Ammonia is among the reduction products when the dilute acid acts on tin and iron, and even hydrogen is evolved as such when the acid acts on magnesium." *

The next thing we must ask is at what rate does the reaction take place, and, if it is desirable to increase its speed, which it generally is, how it can be done without any detrimental effects in other respects.

What must be considered is:

1. The actual reaction (the solution of the metal by the solvent).
2. The diffusion of the products of the reaction, so that they are removed and no longer impede further reduction.

A great deal of work has been done on this question of velocity from the time of Wenzel, who in 1777 found that "if an acid dissolves one part of copper in one hour, an acid half as strong will take two hours to dissolve the same amount of copper, provided that the surface exposed and the temperature remain constant."

The speed at which the etching takes place will depend upon concentration, temperature and rate of diffusion of reaction products. But it is quite obvious there are limits to possibility of concentration. Nitric acid in the case of zinc is an extremely violent mordant in concentrated solutions and is very liable to damage the resist if used too strong, besides being unpleasant and dangerous to handle. The solutions commonly used are from 1 in 40 of water to 1 in 8; sometimes, however, strengths up to 1 in 4 are used.

With regard to perchloride, in concentrated solutions it is very viscous, and this prevents the reaction products diffusing, and so limits the value of increasing concentrations.

Mr. Bull has made for me careful experiments showing the exact weight of copper dissolved in a given time by varying strengths of perchloride of iron of a given quantity. From the slide shown you will see that iron 35° Beaumé is on the whole the quickest solution, and this is confirmed by practical tests and further measurements of a graded strip negative and prints made from the etching from it. As to temperature, increasing temperature will naturally increase the velocity, but apart from the increase of temperature occasioned by the reaction itself it would be undesirable to heat nitric acid solutions when used, as they mostly are, against ink resists, as these latter would be melted. The heating of iron perchloride is, however, frequently resorted to, and increases the speed considerably by enabling the reaction products to diffuse more readily. Some experiments I made some time ago showed that the solution at 45° C. etched in two-fifths the time the solution took at 15° C., *i.e.* two as against five minutes.

Now we come to the principal aid to speed in etching, namely, the agitation of the solvent in order to diffuse rapidly the reaction products, and it is, in my opinion, solely for this reason that the etching machines are superior to the older methods of etching in a tub: its superiority is in proportion to the efficiency with which this work is performed.

The methods hitherto employed to hasten the diffusion of the reaction products have been, brushing the plate when in a still bath, or rocking the tub. The reaction products, however, were not adequately removed by this method, particularly in respect of the bottoms of the etched hollows, the result being that the top edges tended to etch quicker and the hollow tended to become relatively shallow. Mechanical arrangements are used both for rocking and brushing, but they are not the most successful etching machines.

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* Goodchild and Tweney, *Technological Dictionary*.

A method of hastening the removal of the reaction products in the case of copper and iron perchloride is to etch with the surface to be etched face downwards, for as these reaction products are heavier than the iron solution they sink; if the plate is etched face upwards they sink to the bottom of the etched hollows, with consequent shallowness, while if etched face downwards they sink out of the hollows and greater depth is secured. Rocking the plate that is etched face downwards seems to lend no increase of speed.

Coming now to the mechanical aids that have been suggested, I show slides of all the mechanical devices of which I am at present aware, keeping them to some extent, not in sequence of date of introduction, but in order of method, starting with the mechanical rockers and ending with the blast machines.

Diagrams and illustrations of the following mechanical devices were exhibited:—

The first mechanical contrivance, the modern power-rocked tub, the Krol etching machine, the Gerland etching machine, the Boyce etching machine, the Albert etching machine, the Concewitz etching machine, the Holt etching machine, the Bartholomew and Bussy machine, the second Holstrom etching machine, the first suggestion of spray etching machine, the Thorp etching machine, the Danesi etching machine, the Levy acid blast machine, Holstrom's machine, Mark Smith etching machine, Piolunkowski etching machine, Spitzer machine.

The best of these machines is undoubtedly the blast machine, and the reason I believe to be simply that it is more effective in forcibly clearing away the reaction products from exactly the spot where most necessary, namely, at the bottom of the etched hollow. It is sometimes asserted that actual erosion aids the process, but I can find scarcely any mechanical erosion caused by submitting a zinc plate to a machine spray of water for an hour, and no trace at all on copper, so that I do not think this has much to do with the effect.

In general the object of all etching is to attain to a maximum of depth with a minimum of side spread, so that it may be as well to consider how etching would normally take place, and to discuss what is technically known as undercutting.

If we consider a plate put into the mordant partially protected by resist, and reaction products removed from every part equally, then the etching will take place as shown, every point on the bare surface, including the edge of the resist, acting as the centre of the circle.* The only undercut is the undercut under the resist, and this overhanging resist is easily afterwards brushed away. No other undercut is possible with one etching, yet most of the makers of etching machines have claimed that their machines enable one to etch with less undercut.

Now it is seen that as the plates get deeper the line or dot gets thinner and thinner. Where fair depth is required, as in line work, the dot would soon be etched altogether unless the sides were protected in some manner. Two methods are in common use, one in which a waxy ink is rolled over the lines and melted until it runs down the sides, the other in which resin is brushed against the edge of the line from four directions, being fused between each brushing.

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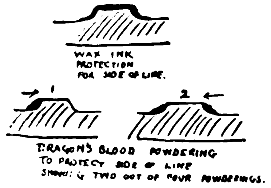
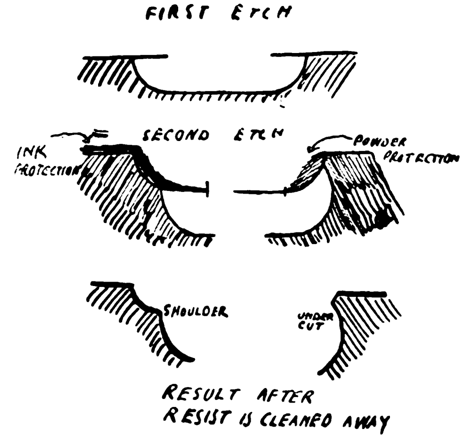
* L. P. Clerc, *Le Procédé*, November 1908.

The inventor of the Levy acid blast has also put upon the market a machine for doing this powdering automatically; it is very successful, and is surely a much more sensible and healthy way of doing so mechanical an operation.


WAX INK PROTECTION FOR SIDE OF LINE.
1
2
DRAGON'S BLOOD POWDERING TO PROTECT SIDE OF LINE SHOWING TWO OUT OF FOUR POWDERINGS.

Now we can see that etching going on as before had a fresh centre at the side, and undercutting may easily occur. If the second etch is accurately judged it is possible to stop just when the line is almost straight, and this appears to be easier with the powdering method, because in the other the wax generally runs along the bottom farther, and therefore the recommencing centre for the etching is farther out. Generally some steps called "shoulder" are left by the ink process, which are removed by a finishing etch.



If the second etching is carried a little too far it is quite easy to see that undercutting may be caused, and in fact undercutting is more frequently met with in the powdering than in the rolling-up method.

Mr. Amstutz has made a great number of experiments with measurements showing the amount of etching at various times during the course of single-tone etching, and all his work appears to me to confirm the simple theory here set forth. The reason why isolated dots etch more rapidly than enclosed hollows is simply due to the fact that a greater surface is exposed to attack. The reason why the spray machines etch relatively deeper than any other method is because the reaction product is removed fastest from the bottom of the cavity and fresh surfaces are continuously exposed there quicker than elsewhere; indeed the inventor of the "Pio" etching machine goes so far as to claim that the reaction products remain on the side of the dot and form a resist there similar to the wax or dragon's blood powder mentioned above.

When the surface of the metal is exposed to the action of the mordants the attack is the same in all processes. In photogravure etching, however, the surface of the metal is covered with a dry gelatine resist varying in thickness. Now the perchloride cannot attack the copper until this gelatine is first swollen so that the mordant can percolate through it, and in order to swell, it has to abstract the water from the perchloride. The stronger the perchloride the less water is it able to give up in a given time, consequently a strong solution will practically only etch those portions of the plate that are covered with only a very thin film of gelatine, and a succession of weaker solutions is used to etch through the gradually increasing thicknesses of gelatine. This theory has been most completely worked out by Dr. Lehmann of Charlottenberg.* Of course one solution will do it quite as well if the conditions of transparency, resist and strength of mordant are all so adjusted that the darkest tone has not etched too far by the time the lightest is just etched enough. (Huson, *Photo Aquatint.*)

Klimsch's Jahrbuch.

THE attainment of its tenth year by this fine representative trade "Annual" is a subject for congratulation. A truism tells us that it is good to associate with good people, and our craft may well be proud of its literary associations, not only with the *Penrose Annual*, which is all its own, but also with the American *Graphic Arts Year Book* and this German *Jahrbuch*, which are organs and reflections of the great printing industry.

It should give great encouragement to the photo-engraver, and a sense of justified self-satisfaction, to see from such a book as this, how largely his own little craft influences the progress and prosperity of the great industry of which it is a part. Printing presses, paper and paper-making methods, inks and their means of application—even methods of book-binding—have been and are being constantly modified and improved to keep pace with the requirements and the improvements of the photo-engraver and the illustrator. These facts are well shown in *Klimsch's Jahrbuch*, not only by the large space devoted to articles directly bearing upon "process," but also by the many incidental references. The supplement illustrations, of course, include many of great interest to process men; one of the most attractive being a pile-print reproduction of an oriental rug in colors, on one of those high-pile papers, with slightly side-spreading inks, that give such an excellent carpet effect. This is from the printery of the H. Stürtz Act. Ges. of Würzburg. Collotype holds its own; three-color and four-color printing is represented by many examples of varied excellence; and there are satisfactory specimens of that "mattkunstdruck" (half-tone on matt paper) which promises to take a prominent place in book illustration ere long.

Specimens and so forth.

THOUSANDS OF STOCK DESIGNS are illustrated and priced in the Catalogue No. 23 just issued by the Universal Engraving Co., 75 Gold Street, New York. The variety of subjects is so enormous that one cannot well indicate it. Emblems of friendly, scientific, literary, and other societies, trade and advertising designs, and many cuts for private and social use, such as hundreds of two-letter monograms, are included.

HENRY G. WALKER'S ELECTROS from stock designs are unusually delicate, graceful, and beautiful in their chaste design and clean lines. They include some good things in head and tail pieces, an attractive set of initial drop panels, and a nice new series of half a dozen letter heads pierced for type. Mr. Walker says that very special care is used in etching the originals, in impressing the matrices, in depositing a heavy copper shell, in backing it up, and in mounting it on selected, kiln-dried mahogany. From our own experience of his blocks we should support his statements fully. His sample sheets are issued from 65 Bayswater Road, Birchfield, Birmingham.

"WOOD-ENGRAVING: A PSYCHOLOGICAL OPPORTUNITY," is the title of a booklet in which the Eclipse Engraving Co. of Cleveland, O., refers to the revival in wood engraving for illustration, and instances *The Century*, *Harpers'*, *The Delineator*, *The Woman's Home Companion*, etc., as magazines that are using wood-cuts with advantage to-day. Incidentally, the company says of its wood-engraving department: "We have always done a profitable business in it, because our work has been good"; and again: "In this particular kind of service we wish only to serve a limited number of customers—customers who can share our enthusiasm, and with whom we can work hand in hand for big results."

SPECIALISATION FOR THE CYCLE AND MOTOR TRADES is practised by the Arthur Cox Company, who issue a fine collection of specimens of half-tone illustrations of these two industries. Four distinct styles are offered in cycle cuts and motor-car cuts, with a couple of other methods of treating motor-engine details. In the cycle section Style No. 1 shows a bicycle brought out in light and dark, with a graduated medium-tone background and square, white-line finish. No. 2 has the machine outlined and the background vignetted on white; No. 3 is like No. 2, but with the frame, pump and mud-guards in color, while No. 4 is the same as No. 3 with a flat tint added. Such suggestions should make strong appeal to all producers of machine catalogues.

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* *Zeitschrift für Reproduktionstechnik*, April 1907.

Business.

The Process Art Company has removed to 557 Clay Street, San Francisco.

The Wolverine Engraving Company of Detroit, Mich., is moving into new premises in a new building on May 1st.

Mr. R. E. Wilkinson has severed his connection with Messrs. Jarrold & Sons, Ltd., of Norwich, and joined the Norwich Photo-engraving Co., of 18 Bethel Street. He will for the future devote himself to supplying the lithographic trade with line and half-tone transfers, specialising in poster work and the needs of the offset and rotary presses.

A complete color-plant is being installed by the Alexander Engraving Company of Toronto. To be sure of beginning rightly, they sent Mr. J. Robson to New York, Philadelphia, and Washington, to pick up "wrinkles" in plants working in those cities. They report that he was treated most hospitably everywhere, and shown and told everything that he wanted to know. This is one of the many proofs of the breaking down of the jealousy and exclusiveness that once characterised the craft.

School Notes.

Mr William Gamble's lecture on "Modern Illustrative Processes" has been much appreciated by the students of the Bradford School of Art, and of the St. Bride Foundation Institute.

A school of paper-making is earnestly desired by Mr. A. D. Little, official chemist to the American Paper and Pulp Association. He only follows the lead of other trade experts in desiring better technical education. England and Germany, which are being copied by the U.S. in this matter, should look to it that their own craft schools are kept in the forefront of efficiency.

Lecturing at the Bradford School of Art on "The Last Word on Lithography and Color Printing," Mr. J. Widdop, in alluding to the depression in the lithographic trade, emphasised the importance of adopting photography in conjunction with the offset machine, and a closer study of the possibilities of aluminium, to enable lithography to hold its own. The fine collection of specimens shown demonstrated that lithography is capable of yielding the finest possible results in art reproduction.

Technical photography is being admirably and practically treated by Mr. Henry W. Bennett in a course at the Bolt Court School, on alternate Wednesdays. Beginning on April 6, the course is to run to June 1st, at 7.30 p.m. Mr. Bennett is one of the wood engravers who was driven to take up the photographic methods that competed with his own craft, and he has become one of the best technical photographers we have. Further, his skill and lucidity in explanation are such that the demand for his services as a teacher has increased year after year. He is one of the very few men who have been engaged for years in succession to give instruction courses for some of the best photographic societies.

The Cleveland Guild of Printers, Lithographers, Bookbinders, and Kindred Arts and Crafts.—A special lecture was recently delivered at Middlesbrough by Mr. Joseph Goodman (Technical Instructor in Lithography and Photo-mechanical Processes, Liverpool), the subject being "Latest Lithographic Machinery and Modern Processes of the Craft: Rubber Offset and Photo Process Methods" (illustrated by lantern slides). The Master of the Guild (Mr. Harold Hood) presided.

Lithographic specimens of work exhibited included a splendid collection of rubber offset pictures from all parts of the world, general commercial work and chromo-lithography, examples of tin-printing, ceramic lithography, decalcomania lithography, photo-litho process work of a remarkably fine character, showing the latest and highest attainments of the combination of lithography and photography, and of the revolutionary methods that were fast establishing themselves in it. The various makes of rubber offset machines were described and the chief features of each. American and Continental lithographic machinery was dealt with, as well as all the home manufactures. The new as well as the older established methods of photo processes as applied to lithography were dealt with, outlines being given of the various processes.

Brevities.

Salt Lake City has just formed a branch of the I.P.E.U.

Yet another process shop was opened in New York on March 15th, in Centre Street.

The Secret of Successful Sales.—A contemporary puts it in two words:—"Sell satisfaction."

Eighty-five new members were enrolled by the I.P.E.U. in Boston, Mass., in the first three months of this year.

The Union Label is proving a strong propagandist card in the United States. In New York, for instance, seventeen firms are using it.

Louisville, September 6, is the brief memo. of the I.P.E.U. convention. Chas. O. Stover aims to make it a happy, helpful gathering.

A combined outing and business meeting of I.P.E.U. members is to be held at Buffalo, N.Y. (taking in Niagara Falls), on July 3rd and 4th.

Masklene —Attention is called to this new help, introduced in our advertisement pages. Further particulars next month, but try one bottle now.

Baltimore, Md., can muster forty-five members and delegates from kindred associations when its Photo-engravers' Union No. 2 meets for its annual banquet.

In the Philadelphia car strike, which almost completely paralysed the trade of the great city, three hundred photo-engravers were amongst the 64,000 trade-unionists who struck in sympathy with the street-car strikers.

Paynetype is being managed in the United States by the Star Engraver's Supply Company, Fulton Street, New York, and we hear of its being worked with success and excellent promise by certain newspapers.

Matt-art prints are amongst the latest Austrian efforts at more perfect reproduction. Matt-faced toned paper and the matt-surfaced inks of Berger & Wirth are used.

A Type-metal Engravers' Union (or Soft Metal) has just been formed within the I.P.E.U., and efforts are being made to organise the soft-metal engravers in all American cities.

The Nippon electros are a recent series of electrotypes offered by Garrett & Atkinson, of Ealing, to printers. Few engravers have developed and pushed a specialty so successfully as our friends of Warwick Works seem to have done with these "stock blocks."

Another general election is evidently anticipated, and it is well provided for by the series of election designs just offered to the printers by Garrett & Atkinson. One-color and two-color subjects, in many different sizes, are proofed on the recent specimen sheets.

The First Photo-engravers' Union in New York was formed in 1885, when there were only three process houses in the city. There were twenty-seven original members, of whom about two-thirds still remain in the ranks of the Union, most of them in New York. The rest have died.

Union Figures.—In Boston, Mass., 90 per cent. of all the photo-engravers are said to belong to the I.P.E.U. New York and Chicago are said to be nearly 100 per cent. strong. Detroit, Spokane, Omaha, and Minneapolis are growing, and several of the western cities report full possible strength—100 per cent.

European filterless collodion emulsion and instruction in its use as a secret process, are offered to the process world by Herman J. Schmidt, whose dry enamel powder process is well known. He offers advice and assistance for reasonable fees, personally, or by post from 343 Sheridan Avenue, Detroit, Mich., U.S.A.

The Spectrum process plates of the Cramer Dry Plate Company, worked out by Mr. R. J. Wallace in the Cramer laboratories, are emulsion-dyed, and are supplied with light-filters made specially for use with them. They are guaranteed to give identical value of gradation for the three color effects, and the light-filters are guaranteed for identity of thickness, plane and parallel surfaces.

"Improved Wratten Dark-room Lamps," as the title of a pamphlet, means much in these days when all men work with color-sensitive plates, and when Wratten & Wainwright, Ltd., are pioneers in catering for the special needs of color-workers. A request on a post card to Wratten & Wainwright, Ltd., Croydon, England, will secure a copy of the pamphlet, and you will be interested.

A MODEL ETCHING-ROOM, and one that shows something of the recent advances and specialisations in process engraving, is that in the new premises of John Swain & Son, Ltd. Three Levy acid blast etching machines are ranged side by side in a specially-constructed, well-lighted, well-ventilated room. A striking contrast to the poky, dark, away-in-the-corner line of hand-rocked tubs that passed for the deep-etching department of many a good firm not very long ago.

TALLENT'S SPECTROSCOPIC CAMERA is well known and approved, and fully deserves the excellent description and illustration that it receives in the booklet just issued by Penrose & Co., Ltd., and obtainable from them at 109 Farringdon Road, London, E.C. If only for its multicolor cover of moiré hues, by Rheinberg's patent rainbow process, the booklet would be well worth having. It is illustrated with spectra to show the advantages of using the camera, and describes certain improvements, including a special slit and wedge for making wedge spectra, that will interest those who already use this apparatus.

TRADE AND PROFESSIONAL COMMUNITIES are being organised by some of the office-builders in the great American cities—following the example of a building in New York exclusively devoted to doctors, providing offices for thousands of physicians, surgeons, optometrists, dentists, etc. Chicago has just completed a whole series of buildings for the printing and kindred trades, with photo-engravers on the top floors. These premises are on Federal Street, and are said to provide "the greatest amount of light for the largest number of tenants." A single great plant supplies electric light and power for all the occupants, and almost all the space was let before the building was completed.

THE PHOTO-ENGRAVERS' LEAGUE has just been started in New York, with twenty-one members. It is organised on somewhat different lines from those of similar associations in the past, looking to the development of the essential and economic principles that govern the business and aiming to prevent unfriendly relations between employer and employed or among employers. The officers are:—President, B. W. Wilson, Jun. (Electro-Light Engraving Co.); Vice-President, C. M. Cooper (Suffolk Engraving Co.); Secretary, John A. Anderson (Consolidated Engraving Co.); Treasurer, C. P. Browning (Galvanotype Engraving Co.). Committee, F. A. Ringler (F. A. Ringler Co.), Emlen Gill (Gill Engraving Co.), and Theodore Stendell (Scientific Engraving Co.).

"DEATH IN THE ETCHING MACHINE" has been the cry in one of the great American newspaper plants which has its own process department. Three deaths are alleged to have arisen directly from working in the rooms with the etching machines, and the difficulty in securing workmen to face the conditions forced an investigation. The conclusion seems to be that while the deaths in question were not, or were only in small part, attributable to the working conditions, those conditions are not good. The etching-room is in the basement of a skyscraper building, three storeys below the earth-level, and the ventilation is insufficient to carry away the acid fumes. This is a most important consideration, which should be thought about when planning any place for an etching-room.

A STARTLING STATEMENT.—G. H. Benedict says:—"It is not known than any of the people operating the largest engraving plants have made more than enough to pay for their plants and their homes." It sounds like a good argument as to the unsatisfactoriness of the "process" trade, yet on second thoughts it occurs to us—(*a*) that in a young business, scarcely out of its experimental stages, it is not so bad if the plant and the home (presumably in addition to the current living expenses) have been paid for out of the profits; (*b*) whatever may be the case in America, certain engravers in Britain and on the Continent are in positions to be greatly envied by their neighbors who are (say) "butchers and bakers and candle-stick makers," though these latter trades are very old established.

"WE ARE NOT ASKING YOU FOR ORDERS, but merely submitting examples of our work for your inspection and opinion. If you decide that it is the class of work you are seeking, select a good printer or catalogue specialist and allow him to undertake the entire responsibility of producing you a satisfactory catalogue, specifying that all the necessary blocks be obtained from us. By so doing, you will get a real good job with a minimum amount of trouble. . . . The work will cost you no more, and you will be saved much worry."

This paragraph, from a specimen sheet of the Arthur Cox Illustrating Company, Ltd., shows how they aim to make business for the printers, while protecting them by not offering to supply cuts to the printers' customers.

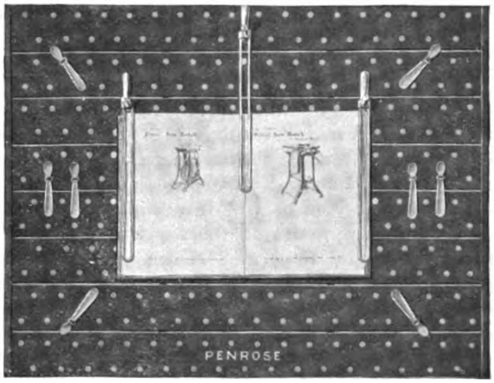
MESSRS. MEISTER, LUCIUS & BRUNING issue the following instructions for the making of three-color filters with the aid of their special dyes. "Blue Filter.—Four grams crystal violet are dissolved in 350 cubic centimetres warm water by the addition of five to six drops acetic acid; 100 cubic centimetres 6 per cent. gelatine solution are mixed with 20 cubic centimetres dye solution and filtered. Green Filter.—Four grams of rapid-filter green I are dissolved in 300 cubic centimetres water; 100 cubic centimetres 6 per cent. gelatine solution are mixed with 20 cubic centimetres dye solution and filtered. (This green filter transmits the extreme red of the spectrum without harm to the exposure.) Red Filter.—Five grams rapid-filter red I are dissolved in 200 cubic centimetres water; 100 cubic centimetres 6 per cent. gelatine solution are mixed with 20 cubic centimetres dye solution and filtered. Optically true sheets of glass are coated with these dyes, 7 cubic centimetres of solution being used for every 100 square centimetres of plate surface. When dry, two pieces of this gelatine-coated glass are cemented together with Canada balsam and bound together with lantern-slide binding, or, better, with strips of thin leather. The blue filter will be found to prolong the exposure about four times over an exposure without a filter when pinachrome or pinacyanol bath plates are used. The exposures through the other filters will be two or three times the time required through the blue filter."

The British agents for these dyes are Messrs. Fuerst Bros., 17 Philpot Lane, E.C.

BELFAST TO BUNDORAN AND BACK was the excursion given by the *Belfast Evening Telegraph* to its staff, of course including the "cut-makers." The trip was intended to be educational, as is explained in the following paragraph; and the programme gave notes as to the stations on the way at which the newspaper trains divided their burdens for the reaching of various districts. One who was present says:—"The proprietors of the *Belfast Evening Telegraph* have adopted a novel idea in regard to those principally concerned in the mechanical production and despatch of two of their newspapers. Finding that many of the case hands and stonemen in particular, together with the stereotypers, news machinemen, and despatch hands, were not as familiar as they ought to be with the district to which the newspapers they assist at printing and despatching are forwarded, the idea occurred to Mr. Robert H. H. Baird, the managing proprietor, that at convenient holiday seasons these men should be taken on excursions to the districts where the newspapers they deal with are circulated. The first of these excursions took place on Easter Monday, when a party of seventy were conveyed to Bundoran, a favorite watering-place in the north-west of Ireland, 130 miles from Belfast. The party included all those mentioned and a number of employees not directly affected by these departments, but who were a long time connected with the establishment. The party were liberally entertained by the proprietors of the paper, and thoroughly enjoyed the educational trip."

THE PERKINS PATENT CLAMP COPYBOARD is but one of the many good things for which the engraver is indebted to A. W. Penrose & Co., Ltd. Like several other introductions of theirs, it has been well tested and thoroughly approved in America before being offered in Europe.

In a copyboard there are two main considerations—the construction of the board itself and the method of attachment of the copy. In this case the board is made by Penrose & Co.—not imported. It is built of narrow planks, with space between, so that they can shrink or swell with climatic changes without warping the surface. It has no battens, so that it is thin, and flat both sides. The clamps are self-fixing, in holes so distributed all over the board that firm clamp-hold can be obtained at absolutely any point; and these clamps are of two kinds, for holding thin copy, or for books, prints in frames, and other thick subjects. The cut illustrates the board and its mode of employment, and it should make an instant appeal to practical workers by its complete efficiency.



THE
JOHN CRERAR
LIBRARY

PROCESS ENGRAVER'S MONTHLY," *June* 1910.

aalburg, described
New York.

Estab. Jan. 1894.
"The Process
Photogram."

THE PROCESS
ENGRAVER'S
MONTHLY
THE PROCESS PHOTOGRAM ESTABLISHED JAN 1894

VOL. XVII. No. 198.
JUNE 1910.

Edited by H. SNOWDEN WARD, F.R.P.S., Founder of *The Photographic Monthly*.

Machine-printed Photogravure: F. T. Corkett's Process.

Like other methods of machine-printed or rotary photogravure, the process of Mr. Corkett is "wropt in mystery," into which it is no part of our business to pry. The system was demonstrated for a few days in London, just before Mr. Corkett left home for the United States, where he has found certain people keenly interested in his methods. We say the system was "demonstrated," yet that seems hardly the right word, for one could not "see wheels go wound," but only gaze in fascination at a continuous band of excellent prints coming over a partition what time the clanking on the other side gave evidence that machinery was running to make these prints.

Naturally, technical details were not offered by Mr. Corkett, nor did we seek them, since this is a secret process. One may surmise that the making of the printing plate is by the method first briefly described in Huson's *Photo-Aquatint and Photogravure*, and indicated by a note on screens in this issue.

Certain features of the process are ascertainable, as, for instance, that the inking difficulty has been solved in a way which we believe to be different from that in which it has been tackled by the Rembrandt and by the Van Dyck (Saalburg). In Corkett's process the prints come over the partition from the machine quite dry, with no tendency to offset, and no necessity for "sheeting." The inventor says that they are dry as they come from the machine, so that, although he has only worked monochromes at present, there is no ink-reason why multicolors should not be printed on one multicolor machine.

Another point mentioned by Mr. Corkett is that his machine is a one-revolution press. That is, the one revolution inks, wipes, or "doctors" the engraved roll and prints the impression.

The speed of printing is about 1800 an hour, for the prints were timed and counted at the demonstration as coming off at the rate of thirty per minute.

Yet another point in the Corkett process, small but important, is that clean edges to the prints are secured without any frisket, cut-out, or other form of guard.

The process appears to be economical, and the examples we have seen—a score of different and greatly varied subjects—are all very fine specimens of photogravure. A long succession of prints of the same subject, in the roll, shows great evenness of inking, so that the method can be said to possess all the essentials of a commercially successful process, even though we are not in position to describe or criticise its technical details.

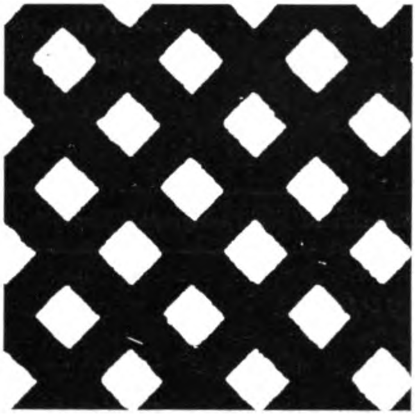


Fig. 1.—The regular Levy cross-line.

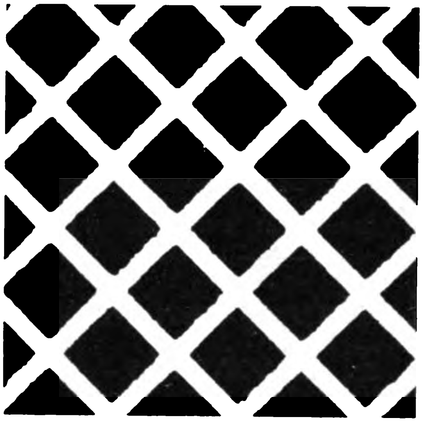


Fig. 2.—The Levy photogravure screen.

Four photo-micrograms of screens and impressions:—

Screens for Machine-printed Photogravure.

A claim for a British patent has recently been lodged by Mr. C. W. Saalburg for improvements in machine photogravure printing. One of the items in the specification, as in the American ones printed last month, is the printing of the carbon tissue before exposure under the positive with a single-line screen for a short while, and then turning the screen and printing again, in order to grain the tissue. This is similar to the method of producing the first half-tone negatives by Meisenbach in 1882, who used a single-line screen, turning it during exposure to obtain his cross lines. This has proved to be unnecessary in the case of negative-making, and is also a roundabout way in the case under consideration, for exactly the same effect can be obtained on the carbon tissue by using a cross-line screen made with white cross lines instead of black; and, as mentioned last month, Max Levy markets such a screen for use in making so-called Rembrandt photogravures. He has kindly given us a sample of his "Economic" variety of this screen, together with an example of the usual cross-line screen for comparison, both of them 150 lines to the inch. A student at the L.C.C. School of Photo-Engraving and Lithography has made an enlargement of these to seventy times, an etching of the results of which we print herewith.

French Tariffs.

The new French duties affect adversely several articles in which our readers are interested. Material increases are made on collodion, celluloid, gelatines, engravings, half-tones, collotypes, printing machines, block-making and stereotyping machinery, negatives, blocks, etc., engraved cylinders or plates for fabric, etc., printing, laboratory apparatus, lenses and telescopes, optical glass and prisms. Many of these were exempt from duty in the old schedule of 1892.

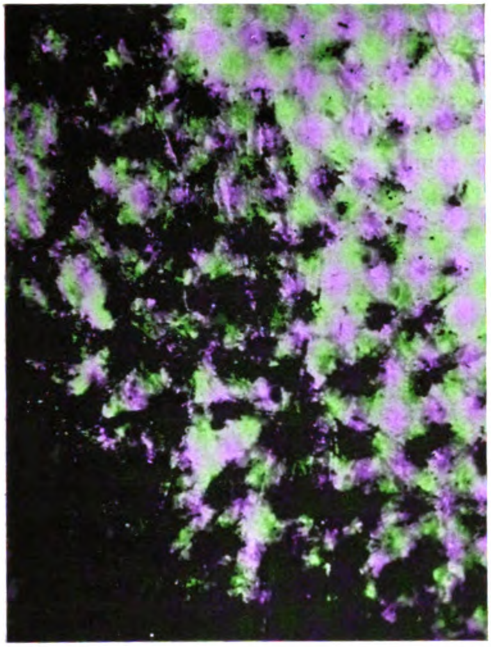


FIG. 3.—Part of a Mertens impression.

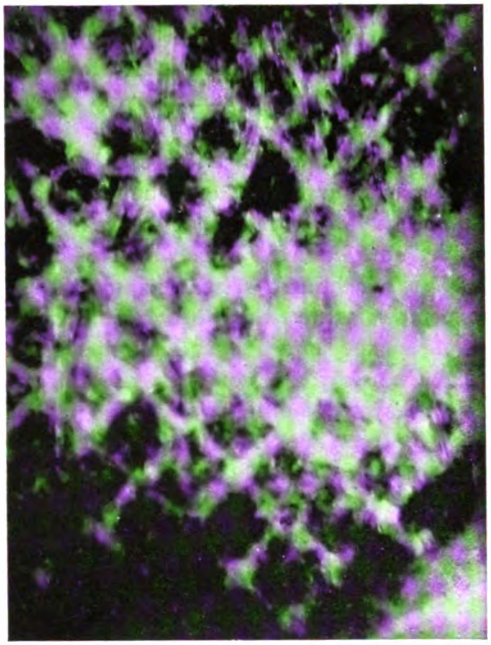


FIG. 4.—Part of a Brinckmann impression.

:—made by students of the L.C.C. School, Bolt Court.

Rotary Photogravure in Newspapers: The Mertens Method.

THE "FREIBURGER ZEITUNG" has achieved a record by being the first newspaper to be illustrated by photogravure, which it did at the end of March, and in following issues. The *Allgemeiner Anzeiger für Buchdruckereien*, describing the first issue, says it has demonstrated the possibility of printing good photogravures amongst the letterpress and on the cheapest kind of rotary news-printing paper. It suggests that the process is similar to that so long worked in England by the Rembrandt Photogravure Co. of Lancaster, and says that since about 1899 the cotton-printing firm of Rollfs, of Siegburg, near Cologne, have been experimenting with a view to engraving their copper printing cylinders photo-mechanically. They first carried out the work in one color, but afterwards adapted the process to multicolor work, and later modified it for printing linoleums. Dr. Mertens, a technical man well experienced in photo-mechanical processes, had been working on a similar invention, and had introduced a process of rotary photogravure for textile printing. The two inventors united their processes, and founded the German Photogravure Co. in Siegburg, where the process of art printing on paper was worked out. The outcome of this is the application of the process to newspaper work. Dr. Mertens has built one of his rotary photogravure machines in tandem with a newspaper rotary of the Voigtländische Machinenfabrik, of Plauen, so that the roll of paper, after passing through the illustration printing machine, simply continues its ordinary course through the newspaper rotary machine, and is at the other side folded and counted at the rate of 50,000 copies per hour. When printed at this enormous rate the illustrations, even to the experienced eye, look like photogravure prints, and come out very fairly on the cheap wood-pulp paper. The medium and lighter tones look very rich, and the shadows have good body.

The *Anzeiger* is satisfied that this new illustration process is full of promise, and that its general introduction must come quickly, as its advantages for periodicals and books cannot be over-estimated. The process can only be used for long runs, as the expense of preparing copper cylinders is great; but when more care can be taken with the printing and choice of paper, the method will leave half-tone and collotype far behind, as is well shown by the reproductions of paintings and the picture post cards on the market which have been produced in this way.

Dr. Mertens has formed a Deutsch-Mertens Gesellschaft with Ernst Brinckmann as managing director, which handles his methods and manufactures his machines for the fabric-printing, and no doubt this concern will develop the newspaper work also. The Alsatian Machine Co. of Mulhausen, Alsace, has taken up the method, and so have several of the calico-printing firms of Mulhausen and Kolmar. In England, licence has been given to the Know Mill Printing Co.; the rights for the U.S. have gone to the Arnold Printing Works, Arnold, Mass.; and the rights for Japan have been placed in the hands of an agent.

Since the notes above were put into type, we have received copies of the *Freiburger Zeitung*, and can confirm fully the comments of the *Allgemeiner Anzeiger für Buchdruckereien.* A little piece of one of the prints has been enlarged for us (fig. 3, p. 123) to allow of easy comparison of its structure with a piece of one of the Brinckmann prints in machine photogravure, which apparently uses the same style of screen as is supplied by Levy and illustrated in fig. 2, p. 122.

Not only the pictorial illustrations but also some of the advertisements in the *Zeitung*—including their text—are printed by photogravure.

In the first photogravurically illustrated issue of the paper, Dr. Mertens corrects the statement that the photogravure sheets are printed at the rate of 50,000 newspapers an hour, and points out that this would only be possible on multiple presses. He says that the paper is actually run at from 4000 to 6300 metres (say 7000 yards) an hour, and that the speed can be increased to 10,000 or 12,000 metres without interfering with the quality of the work. He contends that for any job that requires a whole cylinder, or for a number of jobs that can be run together on one cylinder, the process is as cheap as half-tone, even for short runs; with the advantage of being able to make fine prints on relatively rough surfaces that would be quite impossible for the half-tone method.

A WORD TO THE APPRENTICES, and perhaps to some others. He who reads, rises. He who learns more, earns more. To earn more is a duty you owe to wife and family. If you have no wife or family, you owe it to yourself. Pay it.

✓

Photo-litho Transfers by the Bromoil Process.

By H. M. Cartwright.

AT the present time there seems to be a growing demand for large posters produced by photo-lithographic means, but the necessity of using plates of considerable size has so far proved a great handicap in this work. The bromoil process has suggested to many photo-lithographers a quick and simple method of preparing the transfers whereby the use of an enlarged negative is avoided.

The following account of some experiments carried out with this object in view may not be without interest to others who wish to work this process.

OUTLINE OF THE PROCESS.

The method of working may be outlined in a few words. A small line or screen negative is first made, using in the latter case a fine screen having, say, 133 or 150 lines to the inch. From this an enlargement is made on bromide paper, which is developed and afterwards treated with a bleaching bath containing bichromate, by which means the gelatine is hardened where the silver image lies.

It will now be evident that this print can be treated in much the same way as an ordinary photo-litho transfer, that is, rolled up with a greasy ink, and, after soaking in water, developed in such a way as to leave ink on the hardened gelatine and none on the unhardened parts, which have the power of absorbing water, and therefore refuse ink.

The process is a simple one, but there are several details that require close attention, and it is now proposed to deal with these in full.

THE BROMIDE PAPER.

The first consideration is the selection of a suitable bromide paper. Any paper giving great contrast may be used, provided it has a smooth surface and is sufficiently hard to withstand the somewhat severe treatment to which it must be subjected. For this reason a carbon surface paper seems to be the most suitable. Excellent results have also been obtained on a glossy surface.

The print is exposed and developed in the usual way, care being taken to get the dots or lines as strong as possible without fog or veil between and without spreading. It may be mentioned that it is as well to use a high-light negative so as to emphasise the contrast, since fine etching is impossible in lithography.

As to the developer, experiment proves that almost any may be used, provided it is capable of giving considerable contrast, and does not contain caustic potash, which has a softening action on the gelatine (it will, however, be seen that this is taken advantage of in an alternative method to be described later).

The following are the developers with which the experiments have been made:—amidol, glycin, metol-hydrokinone, and hydrokinone containing caustic potash. All are suitable except the last, but glycin, a very active developer giving great contrast, is perhaps the most reliable. It is not absolutely necessary to fix the print at this stage, providing the developer is well washed out, but it may be done if desired, in which case five minutes' wash in running water will be sufficient.

THE BLEACHING BATH.

The next step is to bleach the print. Several different formulæ have been suggested for this purpose, but the following, which is the result of experiment, has been found to work well:—

Potassium bichromate	(10 % solution)	2 parts
Alum	,,	4 ,,
Potassium ferricyanide	,,	1 part
Potassium bromide	,,	1 ,,
Hydrochloric acid	,,	1 ,,

The action of this bath is rather complicated. It may, however, be briefly stated that the potassium ferricyanide and potassium bromide reduce the silver image, which action decomposes the bichromate, having, in fact, much the same effect as light on this salt, with the result that it tans the gelatine and renders it incapable of absorbing water where the silver deposit is present. The addition of alum to this solution helps to harden the gelatine without affecting its property of taking up water. The acid has a clearing effect, keeping the whites clean, and also makes the bath act more rapidly. The quantity of acid given may be increased if a hard paper is used which has a tendency to tint between the dots.

This bath seems to work best when heated to a temperature of about 75° F. (or even higher with some papers), and it is strongly recommended that this be done. It should be renewed for each batch of prints, as it does not keep well. It is for this reason that it is convenient to have the component parts in ten per cent. solutions.

It takes about two minutes to bleach a print, or rather to convert the black silver image to a light brown color, as the image never disappears altogether. It is inadvisable to place too many prints in the dish at one time, as uneven action may result.

After treating in this way, wash well in running water for about five minutes, then immerse the print in a weak acid bath, made by taking one part of sulphuric acid to twenty of water. This will assist the formation of a slight relief where the gelatine has not been acted upon. When this relief has formed, which will take about six minutes, wash in running water as before for five minutes.

The acid bath does not keep well, and should be renewed each time before use.

DRYING THE PRINT.

The print must be dried before inking up, either spontaneously or by immersing it in methylated spirit for one minute, after which it will dry very rapidly. It has not been found that the spirit has any deleterious effect.

ROLLING UP WITH TRANSFER INK.

The print, when dry, is ready to be rolled up with transfer ink. This operation is one with which all photo-lithographers are familiar, but for the benefit of those not acquainted with the work it may be as well to describe the process.

A very small quantity of photo-transfer ink and a few drops of rectified turps are well mixed together with a pallet-knife until the ink is dissolved. This is then spread evenly on a slab (an old litho stone) with a composition roller, which, when sufficiently charged, is passed over the print a few times, care being taken to distribute the ink equally all over.

A thin grey coating is all that is required; if it appears anything like black, too much ink has been taken.

In order to keep the print in position while being inked up, it may rest on a heavy sheet of glass, about one inch of the paper at one end being tucked under the glass. Or a hinged board made specially for the purpose may be procured and will hold it still better.

After the print is inked up allow the turps to evaporate thoroughly. In cold weather this may be assisted by holding it near the fire or gas for a few seconds, but even in warm weather at least five minutes should be allowed to elapse before it is immersed in water, which is the next step.

LONG SOAKING NECESSARY.

The water should be heated to a temperature of 75° F. The most convenient plan is to have it contained in an enamelled iron dish with a gas ring underneath.

The print should be placed under the surface of the water, face upwards, and allowed to soak for at least half an hour, or still better, for one hour, if time will allow. Care should be taken that the prints are kept separate, if several are treated at once, so as to avoid damage to the ink image; also it is necessary to keep them below the surface of the water, to prevent uneven action.

When sufficiently soaked, the gelatine between the dots will show slight relief, owing to the absorption of water. If this relief is not obtained, as is sometimes the case with papers coated with hard gelatine, it is a sign that the temperature of the water should be raised. If, on the contrary, the gelatine is of a soft description, care should be taken not to overheat the water, as the gelatine might be damaged by so doing.

We now come to that part of the process requiring the greatest care, namely, the removal of the ink from the unhardened gelatine between the dots. Many methods have been tried for accomplishing this, but the following has proved most successful.

The surface moisture should first be blotted off with a piece of blotting-paper of good quality free from fluff; this should be done with care, so as to avoid damage to the ink image.

When this is accomplished the print should be fixed down as was done for inking up. A hard composition roller with no ink on it is then taken and passed over the surface of the print; two or three strokes will effectually clear the whites of the image.

The removal of the ink in this way is assisted by the fact that the unhardened gelatine is in relief, and so no attempt must be made to force the roller into the hollows, which might result in making the transfer uneven. It is for this reason also that a hard roller is recommended.

When properly carried out this method gives a beautifully sharp transfer which can be transferred to stone or metal without difficulty. The secret of success is to soak the print well in warm water, and to use the roller with a light and fairly quick but steady touch.

Such is the process in its most practical form as it stands at present. It will be seen that the whole operation of making the transfer, with the exception of the soaking in water, only takes about half an hour; this time including of course the exposure in the camera.

OTHER EXPERIMENTS.

A few remarks may now be added regarding various experiments that have been tried in connection with this process. Early attempts to remove the ink from the whites of the image by rubbing under water with cotton-wool were unsuccessful, there being a great tendency for the ink to rub away from the work. A modification of this method can, however, be employed.

After soaking the print in warm water as described above, a piece of wet cotton-wool is lightly dragged over its surface, care being taken to keep it under water all the time. This method does not seem to give such a sharp dot as when a roller is employed.

Attempts were also made to roll up the transfer while still wet after removal from the warm water, instead of applying the ink before soaking. Here the difficulty arose that the gelatine does not adhere well to the paper, and is apt to blister or come off altogether before the inking up is complete.

If the routine of work first described be adhered to, the bleached image will in time blacken again with continued exposure to light. The only objection to this is that it makes it a little difficult to see the amount of ink on the transfer when completed. This can, however, be obviated by immersing the print in a hypo bath, as ordinarily used for bromide paper. This should be done after treatment with the weak sulphuric acid, a short wash being first given to remove the excess of acid. Two minutes' immersion is sufficient, then wash again for five minutes and dry as usual.

There is another method of preparing the transfers, based on the carbon process. In this case the paper is treated in the same way as outlined above, except that instead of merely soaking in warm water after rolling up, the print is placed in water at a temperature of from 90° to 110° F. By this means the unhardened gelatine is dissolved away leaving the hardened parts, bearing the ink, standing in relief above the surface of the paper.

The only disadvantage in this method is that the gelatine is apt to squash in transferring to stone or metal.

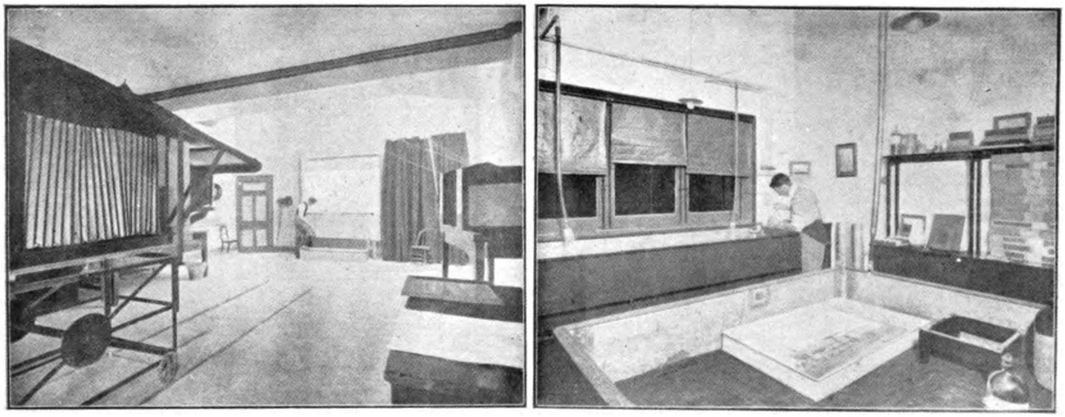
In this process the best results have been obtained when the bromide print has been developed in a developer containing caustic potash, as this softens the gelatine and causes it to dissolve more readily.

With some makes of paper a higher temperature than that given above may be necessary to render the gelatine soluble.

Actual practice has proved that by following the method first described, transfers can be prepared in a reliable and satisfactory manner by the bromoil process. It will, however, be seen that there is still a large field for experiment and investigation, and it is hoped that the foregoing notes will help to stimulate an interest in this process.

In conclusion, it may be mentioned that many of the experiments in connection with this work have been made in the collotype and photo-litho class of the L.C.C. School, 6 Bolt Court, conducted by Mr. W. J. Smith, to whom the writer is greatly indebted for much valuable advice and assistance.

WATKINS' PATENT PRINTING METHOD, claimed by Arthur O. Watkins, of London, has interest for block-makers, though its useful applications do not seem obvious at first sight. He proposes to impress light-colored paper with an uninked forme, then to ink the unpressed paper with dark-colored ink, and after the ink is dry, to press the paper level. The use of an ordinary cut, or of ordinary type, would give a negative or reversed result—light printing on dark paper; and such print is advised by some, as being less trying to the eyes than black ink on white paper. Mr. Watkins' first claim is:—"The method of printing on paper, which consists in indenting a light-colored surface with uninked type, then passing an inking roller inked with a darker color than said surface over the unindented portion of the surface, and finally removing the indentations from said surface."



Operating Room. Bromide Developing Room.

The Government photo-litho department, Adelaide.

New Premises of the Government Photo-lithographic Department of South Australia.

Owing to the increased work which had been created by the amalgamation of the photo-lithographic branch of the S.A. Survey Department with the same branch of the S.A. Government Printing Department, there has been felt for some time past a need of an improvement in the accommodation and plant. This has been provided in the new wing of the Government offices just completed, and South Australia has now the most complete and up-to-date photo-lithographic department in the Commonwealth, under the skilful supervision of Mr. Alfred Vaughan.

On the ground floor, right at the eastern entrance to the building, is the photo-lithographer's office, which is furnished with maps and specimens of all kinds of litho and photo-lithographic work, also photo-enlargements, which it would be hard to excel.

Here we discover that all work in connection with lithography, photo-lithography, and photography, with the one exception of the criminal branch, is undertaken by this department, including all plans for the survey and lands departments, engineer-in-chief, hydraulic, and railways departments, electoral maps, both State and Federal, and all work required by the Government printer for various departments, Treasury bills, duty stamps, beer duty labels, tickets for Government tramways and suburban railways, military, meteorological, copy and drawing books and maps, etc., for the Education Department, and all photo work, including lantern slides for the State tourist bureau; also photos for railway carriages and agent-general's office in London. The enlargement photos required for advertising the state are an important item in the photo work, and include some of the finest scenery to be found in Australia; for which the Department received the highest award at the recent Franco-British Exhibition.

MR. ALFRED VAUGHAN,
Government photo-lithographer, Adelaide.

The photographic branch includes eight well-lighted and ventilated rooms. The operating-room measures 23 x 40 feet, the glass portion of the roof being so constructed as to give the light on the copying board during the working hours, the other parts of the room being in subdued light. To minimise the heat the glass portion of the roof can be reticulated with water, and by this means the temperature is considerably lowered.

The dark rooms, both for dry and wet plate work, are completely furnished. That of the "wet plate" is so constructed that the ether is allowed to fall through the floor by means of perforated holes. The separation of this room from the other rooms by means of an air passage keeps the ether from penetrating to the other parts of the building. The room for toning and finishing the photo prints is large, well lighted and ventilated, as are also the photo-litho transfer and bromide development rooms.—*Australian Photographic Journal.*

Focus.

FOCUS yourself on your work. Get the right angle on it. Keep your perspective. Hold the correct level and the right elevation. Watch your distances. Adjust the lens of your mind accordingly.

Don't get so close that you get blurred with details. Don't be so distant that you get out of touch with it. Don't go off on a tangent where you get only one view-point.

Study it from all sides. Observe its advances and retreats. See it in its varying lights. Watch the changing conditions surrounding it, the influences bearing on it.

Keep it in focus.—" Brush and Pencil."

To Employers.

EMPLOYER! Did you draw as much money from your business at the last stock-taking as you would have earned if working for another man? Did you get pay for your overtime? Did you take five or six per cent. on your capital invested, after paying for depreciation of plant? If so, well. If not, pause and think about your position. These are considerations put forward by *The Master Printer*, and they are as important to our own readers as to men in any craft. If they cannot be answered satisfactorily, it is not necessarily any reflection on the business man, but it means that there is something wrong either with the business in general, or with his business in particular, and the condition calls for anxious thought and investigation.

("The Process Photogram.") June 1910

Color and its Treatment by Process Men.

Notes on a lecture introductory to a series of demonstration lessons by Mr. A. J. Bull at the L C.C. School of Process Engraving, Bolt Court.

The lecturer began by explaining different methods of resolving white light into its component parts, and reminded his hearers that although light travels at the rate of 180,000 miles a second in air, in glass it slowed to about 112,000 miles a second. After decomposing white light with the prism, the method with ruled gratings was demonstrated. Ruled screens and diffraction gratings of varying degrees of fineness were used, and it was pointed out that the finest screens give a much more brilliant and well-defined spectrum than the coarser.

Mr. Bull continued by saying that light consisted of a wave motion analogous to the ripples on a pond; it travelled in a tenuous medium permeating all space, and called by scientists ether. Before one could deal practically with a spectrum one must be able to identify the component parts of it. This could be done by ascertaining the length of the waves of the different parts, or the frequency with which the waves vibrated to and fro. What did not alter was the frequency, and this must be measured, but its speed was so enormous that no direct method of measurement had ever been discovered. Therefore, instead of describing different kinds of colored rays by their frequency of vibration it was customary to name them after their wave-length in air. The wave-length in other media—as in the glass of a lens or prism—was different, because the speed of the light's travel became less. The wave-length of light was so extremely small, however, that it required a very small unit of measurement, and Anders Angström of Upsala, in his *Researches on the Solar Spectrum*, suggested a length which was one ten-millionth of the millimetre, and was known as the "tenth metre," or the A.U. (Angström unit). The wave-length of red light, the longest, was about 7000 "tenth metres," and the shortest (the violet) was about 4000 "tenth metres."

The speaker next gave hints on identifying the various portions of the spectrum so as to say what wave-length any part of it had. If they placed in the electric arc—at a sufficiently high temperature—any of the lighter metals, and examined the spectrum of the light, it was not continuous. An incandescent solid or liquid gave a spectrum in which there is no break, however much the light was spread out. All wave-lengths seemed to be present. This was still rather a problem; for it seemed to prove that white light must contain all those different kinds of vibration. The complications of white light became almost unthinkable. If they put common salt in the electric arc, they would find that sodium, one of the constituents of common salt, gave a kind of light which was not continuous, but consisted of just one line only. Soda glass, lithium, thallium and potassium were then examined in the spectroscope, and the lecturer showed that all these had characteristic spectra, giving lines which were easily identified and whose wave-lengths were known. In this way one could map out the different parts of the spectrum, and so make a scale to identify each part of it at any time.

To show the nature of "selective absorption," which gave their coloring to the objects seen around us in Nature, the lecturer placed in the path of the light from the lantern a number of transparent colors; pointing out that practically all the colors which we see, except the blue of the sky—all the colors of flowers, dyes, and so on—were produced by selective absorption. Complex white light fell upon the object, and only a part of that was reflected back to the eye. Some of the light was absorbed, and owing to certain parts of the white light being absorbed the light reflected to the eye had a colored effect. If the light happened to go through the subject the effect was similar. Ordinary pigment yellows absorbed the blue and violet out of white light, and reflected to the eye the red and green, with the colors intermediate between these. Yellow was therefore not pure, but a compound color.

Bearing in mind the general appearance of the spectrum, one would suppose that green objects were those which transmitted or reflected chiefly green light, which was the case; the various shades of green being determined by the proportion of other colors present. Blues were of a more complex character than the yellows and oranges, consisting of blue, violet, some green, and generally a little red.

Surface-colors and transparencies gained their color from white light in the same way, in each case absorbing part, while reflecting or transmitting the rest of the light. But there was this difference between reflection and transmission, that while surfaces seldom or never absorbed the whole of any particular color in a bright white light, and therefore did not reflect absolutely pure color, a transparency sometimes removed the whole of the light it tended to absorb. There were crimson glasses which allowed no blue or green to go through. One realised this when photographing the interiors of churches with stained-glass windows on ordinary photographic plates. Many of the red or orange pieces of glass removed the whole of the violet light, and therefore appeared in a photogram on an ordinary plate as perfectly black, and no amount of exposure would give any detail in them But where the light was reflected from the surface there was a difference. No part of the white light was then completely removed by selective absorption, so that a little white was always present. When the white light fell upon a red flower, for instance, it suffered some reflection at the outermost layer of the petal, and that light was white. But the greater part of the light penetrated just a little way into the substance of the petal, and there underwent selective absorption. The green was removed from the white light, and white deprived of its green was reflected from the flower.

Finally, the lecturer dealt with the color-sensitiveness of photographic plates. It was explained that the way in which this could be conveniently visualised was by means of a spectroscope, in which the spectrum could be photographed on the plate to be examined. Having developed such a negative and dried it, a contact positive was made from it. This would be transparent where the light acted in the first place. Having put the positive back into the spectroscope, so that it occupied the same place as the original plate, and thrown a strong light on to it, the only light which went through it would be the light recorded in the first instance. The ordinary photographic plate had more sensitiveness to blue and violet than to other portions of the spectrum, but we have now plates sensitive not only to the green portion of the spectrum in addition to the blue, but also plates that are sensitive to the red.

In concluding, Mr. Bull showed examples of orthochromatic and panchromatic plates, and said that few of them had a good sensitiveness to red light. One of the dyes now used for sensitising (pinacyanol) had enabled them to reduce their exposures under the red filter by something like two hundred times, and was an immense improvement upon anything that had preceded it.

Color in Advertising.

ONE of the many important things which advertisers are learning is that, in so far as the quality and characteristics of the goods are concerned, it is not safe to leave very much to the imagination of the public. Speaking broadly, there is no such thing as imagination. Nobody can imagine a non-existent thing. If you were asked to imagine a new animal, you would give it the head of a dog, the body of a cat, rabbits' feet and a peacock's tail—or something of that sort. In short, you would simply make a new combination of existing things, which is all that imagination amounts to. Therefore, if the advertiser leaves anything to the imagination, he will fail unless in his advertisement he gives, in some way, a description of his goods which immediately "connects up" with some existing thing whose characteristics are well known to the reader of the advertisement.

In the early days of advertising the announcements of merchants and manufacturers were restricted to the briefest general statements as to the nature of their wares. After a time, advertisers learned that it was necessary to describe quality and give details in order to attract purchasers in any considerable numbers, and, later, that pictures were an invaluable aid.

The use of pictures in advertising is now almost universal. Their value in selling goods of all kinds is admitted, and its best measure is determined by the lavish use of cuts by department stores. They use cuts with great freedom, and find that even the most commonplace cuts of ordinary articles are worth the space they occupy. Pictures, as has been often said, are the universal language. They catch the eye quickly and tell the story, in part at least, at a glance.

Of late years the movement toward color in advertising illustrations has been strong and rapid. The three-color process is making rapid strides, as well as lithography and other forms of color advertising. The three-color process is comparatively young. Only a few years ago it was extremely unsatisfactory, and in an experimental and uncertain stage. To-day the work is a marvel of accurate reproduction of the exact form and colors of commodities of all kinds, photographed directly from the articles themselves.

Color is now used extensively in advertising, both to the trade and to the consumer, by the manufacturers of rugs, draperies, wall paper, furniture, food products, soaps, perfumes and other toilet articles, lamps, pottery, bronzes and decorative articles in general, all kinds of musical instruments, women's garments and accessories, and packet goods of every sort and description, even to such humble articles as inks and mucilage. Liquid paints are extensively advertised in color, not only to show shades and tints, but the packages in which they are put up.

Color is now a substantial aid to travelling salesmen in many lines, who instead of burdening themselves with heavy samples, carry colored pictures, which show the goods precisely as they are. The advertising of the different National Biscuit Co. products, together with the most extensive and inviting description of their quality and cleanliness, could never have sold them in such enormous quantities were it not for the tremendous amount of advertising which has been given to the style of the packages and their exact appearance in natural color.

The mail-order trade is now using color extensively. Experiments prove that results secured from color pictures are many times larger than those received from black cuts. The colors show people not only the textures of fabrics and the grain of woods, but the exact colors down to the faintest tints. As a result, they are not called upon to imagine colors—they see precisely what they are going to get. One Chigago mail-order house now keeps twelve presses busy the greater part of the year in turning out colored covers, inserts, etc. The fact that it pays to do so must have been proven long ago, and it is perfectly easy to see why it should pay. A description of color in words means but little. To say that a thing is red means almost nothing, for the reason that there are so many red tints, the technical names of which are not known to the ordinary run of people—so, unless you can show them the color, it is impossible to describe in it words which they will understand.

Color is not absolutely essential in many lines, but in some it is. For example, if a woman were buying a rug from a mail-order house, she would have no means of knowing whether it would match the furniture and fittings of her home unless she could see the rug in its actual colors.

The use of color is of value to the advertiser in three ways: First, for the attractiveness of color to the eye; second, for the ability of color to show characteristics which the buyer wishes to know; and third, its ability to accurately reproduce the color of packages—this being what might be called a trade-mark attribute.

The use of color for its own attractiveness is in itself a strong sales influence. Everybody, from the young to the old, loves color. It is the first thing which the infant recognises. It attracts the eye and focuses it where its absence would be passed over. Arrange a dozen pictures on a wall, eleven in black and one in color, and the eye of practically everybody who sees the pictures will fall directly upon the one in color.

Color used to show materials, fabrics, textures, and the many different shades and tints which may enter into the composition of an article, is of tremendous assistance to the manufacturer, and modern color processes make it possible to reproduce anything from a brilliant scarlet to the soft tones of a piece of ivory. In nearly all lines this use of color is profitable.

A great improvement in this branch of color printing in recent years is due to the increased skill and experience of the engravers, to a better understanding of the manner in which to merge the inks in order to produce tints correctly, and to an improvement in the quality of paper produced by the paper manufacturers for the requirements of color work.—Slightly condensed from *Advertising and Selling*.

("The Process Photogram.") June 1910

Diaphragms for 60° Schulze Screens.

Combined from two articles by H. Calmels in *Le Procédé.*

We were not able at the time of our first notice of the Schulze screen to state precisely the shapes of diaphragm used in making the examples added to the text by which our article was accompanied, as we should then have hindered the inventor in his steps to obtain various foreign patents. These being now gained, there is no reason for further reserve, and we will finish our former article by the means required by outlining the diaphragms allowing, as we showed at that time, a quasi-automatic effort whose results are surprising by the wonderful perfection of their gradation.

Draw with A as a centre a circle of the same diameter as the largest opening of the diaphragms; draw the vertical diameter of this circle (fig. 1), then the regular hexagon marked from each intersection of the vertical diameter with the circle; draw with the same opening of the compass already used in drawing the circle, arcs whose intersections with the circle itself determine the angles of the desired hexagon.

Join by straight lines each of these points to the two others which are opposite. These lines cut respectively at six points, among which are chosen points *b*, *c*, and *d*.

From the centre A mark a circle whose diameter should be a third of that of the total opening.

From points *b*, *c*, and *d* mark circles whose diameters *b*, *c*, and *d* should be respectively

$$b = 70{\cdot}75\,; \qquad c = 57{\cdot}50\,; \qquad d = 50,$$

the diameter *a* of the preceding circle marked in A being counted for 100 units. Finally, around each of the tops E of the hexagonal, mark a circle whose diameter *e* expresses in the same unit what is shown below,

$$e = 44{\cdot}75\,.$$

The surfaces of the circles thus marked are then in the following proportions:—

$$\mathrm{A} = 2\ \mathrm{B} = 3\ \mathrm{C} = 4\ \mathrm{D} = 5\ \mathrm{E}.$$

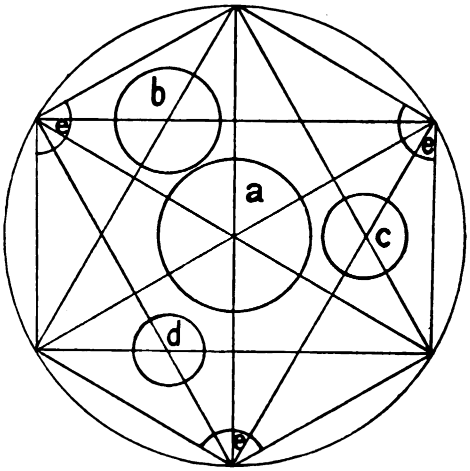


Fig. 1.

In the case of fig. 1, where we suppose at the opening of the diaphragm a diameter of 60 mm., the diameters are respectively

$$a = \frac{60}{3} = 20\text{mm.}; \; b = \frac{20 \times 70{\cdot}75}{100} = 14\text{mm.}15;$$

$$c = \frac{20 \times 57{\cdot}50}{100} = 11\text{ mm. }50;$$

$$d = \frac{20 \times 50}{100} = 10\text{ mm.};$$

$$e = \frac{20 \times 44{\cdot}75}{100} = 8\text{ mm. }95\,.$$

The different circles thus determined will be hollowed out to form the normal diaphragm; the openings *e* can be made as indicated within the limits of the hexagonal space without inconvenience open in a circle, the excess of the opening being hidden behind the ring supporting the diaphragms.

These same openings *e*, partly eclipsed by another diaphragm with hexagonal opening and angles in exactly corresponding positions, will form the working diaphragm.*

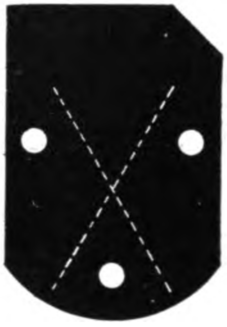


FIG. 2.

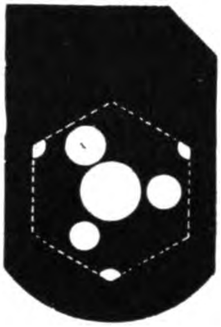


FIG. 3.

The small diaphragm and the auxiliary diaphragm do not demand, in using, the same precision, and it will suffice in making them to reproduce our figures, bringing them to the same scale as the two preceding ones in their real marking; we give, however, expressed in the same units as before, the approximate diameters of the openings to be carefully used, on one hand, over the small diaphragm (fig. 4)—

$a' = 56$; $b' = 39{\cdot}5$; $c' = 14$;

and, on the other hand, over the auxiliary diaphragm, joined up (fig. 5)—

$a'' = 56{\cdot}5$; $b'' = 37{\cdot}5$; $c'' = 25$; $d'' = 19$,

the different openings being consecutively brought to one only by the successive draining of three arcs of a circle, each tangent respectively to three of the openings already made. It is to be noted under these conditions the total surface of the large diaphragm is slightly larger than that of the circular diaphragm the diameter of whose opening would be half of that of the largest diaphragm; that of the small diaphragm corresponds to that of a circular diaphragm whose diameter should be about one-fifth of that of the largest diaphragm; this relation will more easily allow the determination of length of exposure.

The openings not being formed symmetrically, it is necessary to note a signification for each one, and, consequently, to mark either a face or a corner which shall always be placed in the lens in the same position; we represent exactly the different diaphragms with the upper right corner of each sheet cut off; this corner should always be kept to the right in order to avoid all error of placing.

New diaphragm forms have recently been devised by the inventor for the screen for monochrome images, and allow, almost automatically, the obtaining of equivalent results with a slight complication in arranging the diaphragms.

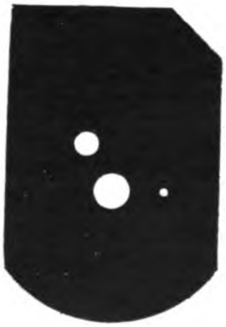


FIG. 4.

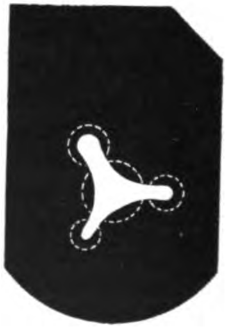


FIG. 5.

These diaphragms, drawn below, are respectively intended for exposure to strong light (fig. 6), half-tints (fig. 7), and shadows (fig. 8), fig. 6 indicating, besides, the geometrical constructions required to mark the three openings.

Mark a circle of the same diameter as the largest opening of the diaphragms.

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* The two dotted lines marked on this figure indicate the direction of the two systems of lines constituting the 60° screen.

Mark, as formerly, the regular hexagonal traced in the circle, this hexagonal forming this time the opening of the largest diaphragm. Construct, finally, the equilateral triangle obtained by joining every second top of this hexagonal, and join to the centre of the circle the three tops of this triangle. From the same point taken as a centre, trace a new circle having for its diameter a third of that of the first circle drawn; draw a hexagonal in this circle the sides of which are oriented like those of the former one; extend, as indicated on our diagram, three sides of this new hexagon to their intersection with the sides of the triangle. Finally, choose among the different designs those to keep for the profile of the opening for the second diaphragm.

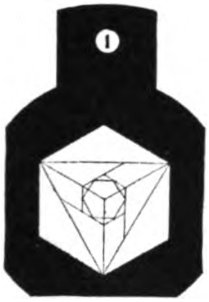

Fig. 6.

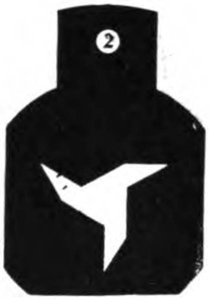

Fig. 7.

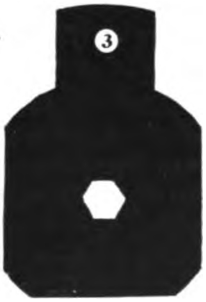

Fig. 8.

For marking the third opening join successively the middle of each of the sides of the small hexagon so as to form a new regular hexagon, rather smaller than the former and 30° relatively to the first. Let us not finish this article without noting here the very interesting study by M. F. Dogilbert, recently published in this journal, on the forms to adopt for three-color negatives, by means of the Schulze screen.*

Since the publication of our recent article on this subject we have recognised the possibility of automatically using the new set of diaphragms described in that article, where it was represented by figs. 6, 7, and 8.

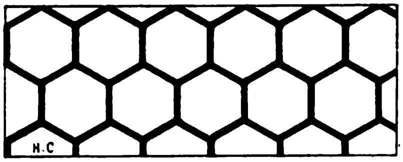

Fig. 1

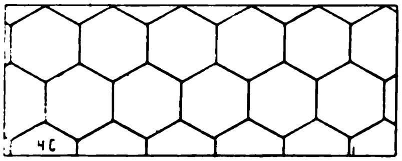

Fig. 2

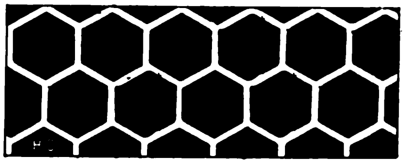

Fig. 3

We show here the rules to be observed for the automatic use of this sort of diaphragm.

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* *Le Procédé*, April 1909, p. 53.

Placing in the lens the large hexagonal diaphragm (fig. 6), move the screen backwards and forwards and roughly observe the appearance of the image of a clear part of the picture; for on slight deviation of the screen the image will appear as in fig. 1. By increasing the deviation the dark bands limiting the clear hexagonals become more and more fine until they almost entirely disappear (fig. 2).

At this distance the screen is correct. By increasing the deviation beyond this position the bands will become clear, leaving dark hexagonals between them (fig. 3), the characteristic appearance of an exaggerated deviation.

Exposure is then given by means of the diaphragm fig. 7, whose opening resembles the profile of a cock's head, the diaphragm fig. 8 being reserved for exposing on white paper or flashing. The special diaphragm for exposure can thus be fixed for several sizes of openings. If the longest part of the exposure is given with the opening which corresponds to that of the focussing diaphragm, a smaller one can be used to complete the exposure.

The Printing Trades Exhibition.

This important exhibition of all that pertains to the printing, stationery and allied trades will be open, at the Royal Agricultural Hall, when these lines are published. It promises to outshine even the great printing exhibitions previously arranged by the same organisers. Amongst the members of the advisory council the following are connected with the reproduction branch of the trades:—Sir Henry Bemrose, J.P., President; Walter Boutall (Vaus & Crampton); Charles L. Burdick (Aerograph, Ltd.); Arthur Cox; A. E. Dent; Frank Horsell (F. Horsell & Co., Ltd.); Edgar S. Hunter (Hunters, Ltd.); and A. W. Penrose (Penrose & Co., Ltd.).

Amongst the exhibitors are L'Imprimerie Nationale, Paris; M. P. Orsoni, Paris, showing a block-levelling machine of much ingenuity; and L'Ecole Estienne, Paris, with a large number of other concerns that will show French illustration work in an incidental way. Amongst the British exhibitors of whom we are advised at the time of going to press may be noted:—The Aerograph Co., Ltd.; Algraphy, Ltd.; Allen & Co., Ltd.; the Anglo Engraving Co.; the British Litho Stone Co.; the Carlton Studios; the Dalziel Foundry, Ltd.; A. E. Dent & Co., Ltd.; Carl Hentschel, Ltd.; R. Hoe & Co.; F. Horsell & Co., Ltd.; Hunters, Ltd.; Geo. Mann & Co., Ltd.; A. W. Penrose & Co., Ltd.; W. W. Sprague & Co.; John Swain & Son, Ltd.; Taylor, Garnett & Evans Co., Ltd.; and the Arthur Cox Illustrating Co., Ltd.

One of the great attractions for the printers and the general public will be a complete engraving shop in actual operation. The plant has been installed by Penrose & Co., Ltd., and is to be worked by the staff of the Arc Engraving Co.

Offset printing, which still attracts so much attention and comment, which is growing rapidly in spite of destructive criticism and opposition, and which offers both threats and promises to the photo-engraver, will also be demonstrated in full, practical operation, and should interest our readers very greatly.

An international collection of printed matter in all styles and processes will attract many to the galleries and repay a good deal of time and attention.

To process workmen three prizes are offered for the best short essays in answer to the question " What did you see at the Exhibition which you think might be introduced into your department with advantage ? "

American Mezzogravure.

" THE INLAND PRINTER" says of this process : — The Mezzo-Gravure Company, of New York, profiting by the experience and disappointment of early pioneers, have accomplished in a remarkably short period a result so closely approximating the finest of hand-made photogravure, that but little is left to be desired. This condition has been brought about after some four years of careful and painstaking experiment by Mr. William H. Bartholomew. With an experience of twenty years' work in photo-engraving, during which time he was largely instrumental in the development of the half-tone process and color processes, he was able to avoid many of the difficulties which now beset the path of imitators of the mezzogravure.

The installation of the machinery in their plant in New York city was begun in February of last year, and so closely had they calculated and planned their work that by October the result from their process was in demand by such firms as Tiffany & Co., the National Lead Company, Marshall, Field & Co., and hundreds of others in a like position to be accurate judges of the value of their product.

Publishers of *de luxe* editions requiring unusual artistic interpretations of their illustrations, or merchants in the compilation of catalogues intended to reach a highly discriminating clientèle, will find mezzogravures of more than passing interest.

The fidelity of tone and character opens up a field for illustrating heretofore too expensive to be considered in connection with mercantile work.

The recent growth of the business has demanded increased facilities and the organisation of a selling force, which has been placed in charge of Mr. Charles Francis Jones, with headquarters at 27 East Twenty-second street, New York city.

Mr. Jones has had a great many years' selling experience, and has for a long time been identified with the printing trade, bringing to the Mezzo-Gravure Company a knowledge of men and conditions which should be of inestimable value. Combining, as he does, a trained artistic mind, an advertising instinct of no mean quality, and a tact for business organisation and development, he seems to be the right man in the right place.

On the occasion of a recent interview with Mr. Jones he expressed the opinion that the field for his efforts was so unlimited in its scope as to be practically a revolution in the illustrating world.

Said Mr. Jones : " There is no question that the artistic instincts of the general public are rapidly developing through the many opportunities which are now offered to judge the works of the masters, both ancient and modern.

" For many years it has been the habit

of the advertiser to illustrate his various publications, from post-cards to bound books, with highly colored reproductions, most of which were so far out of proportion in their effects as to look ridiculous to the cultivated eye.

"With fifteen million homes in the United States with walls on which to hang artistic reproductions, and the inclination of eighty million people to beautify their places of abode, and with their artistic instinct ever reaching a higher plane, it can only be a matter of time when the merchant will appreciate the value of this field and embrace it by reproducing this artwork in a manner to appeal to this vast public.

"An illustration of this condition was sharply outlined on the occasion of a recent visit to the office of the advertising manager of one of the largest national advertisers. With a beautiful mezzogravure reproduction on his desk he called my attention to the lithographed hanger of a competing manufacturer. The lithograph was beautiful in the extreme, with exquisite shading, beautiful proportions and well-considered subject.

"Said I to Mr. Advertiser, 'It is beautiful. Would you hang it on the walls of your own home?'

"His answer was emphatically, 'No!'

"'Would you hang my mezzogravure on your wall?'

"'That is exactly what I intend to do with it,' said he. 'I shall have it framed this week.'

"This little scene aptly illustrates the condition of ninety per cent. of the buying public to-day. A really fine reproduction is kept and treasured. It is an ornament to any home, which ninety-nine per cent. of the lithograph or color-process reproductions will not supply."

Specimens and so forth.

WOODLINE TREATMENTS are amongst the specialties of Gatchel & Manning. They consist of a somewhat irregular white tooling from the background behind the portrait head, and by their difference in tone and texture throw up the portrait very effectively.

SESSIONS & CO. OF BOURNEMOUTH and London do some excellent half-tone work, submitting specimens in very good style. Their latest folio to reach us gives an example of catalogue engraving in two colors, and of half-tone in coarse, medium, and fine grain. The firm undertakes to despatch blocks the same day as ordered when this is required.

THE GATCHEL & MANNING SPECIMENS include many specialties outside the line of the usual photo-engraver, some of which are mentioned in other paragraphs. Another is the intaglio half-tone for plate press printing. The fact of any process house specialising in this work evidences the growth of the demand for photogravure. The specimens also include some delightful vignetted three-color fashion sketches and a number of three- and four-color reproductions after old and modern masters. Many of these are intended for publication for the print sellers, and they are well worthy of purchase for the adornment of any home of refinement.

SWAIN'S QUARTERLY grows continually in interest and attractiveness, and the latest issue is an unusually strong exemplification of the excellence that can be, and has been, reached in three-color work. The selection of the subjects is good. Not only are the pictures interesting in themselves, but they are evidently chosen to show the power of the process in dealing with (*a*) subjects in brilliant colors, (*b*) subjects in soft, delicate tints, and (*c*) subjects in which the brilliant and the delicate are combined.

To our readers who are themselves half-tone color men, such a publication should be valuable as setting a high example of expensive, wise, effective advertising, and as doing something for the general "uplift" of color work.

Business.

Stewart, Bell & Schwart have just established a new photo-engraving business at 11-16 Woodbridge Street, Detroit, Mich.

Armitage & Ibbetson, Ltd.—A petition for winding up this company was presented on 19th May by the Bradford District Bank, Ltd., and was directed to be heard before the Court on 25th May. This fine old business has always been interested in, and amongst the pioneers of, photo-mechanical work, and some twenty years ago, if not more, it was notable for having the largest process camera then existing in the world. We doubt whether this fine piece of apparatus has ever been exceeded in size by any camera in actual practical use, and we believe that even the Mammoth camera built by Penrose & Co. for the Crystal Palace Exhibition of Photography was not so large. The Armitage & Ibbetson camera took its operators inside, and by means of suitable mechanism they were able to move the camera or the copy in any desired way from inside the body, which was more like a sitting-room than a camera.

Brevities.

Akron, Ohio, has established a branch of the I.P.E.U.

Why did the dark slide?—Because it saw the light filter.

The Printing Exhibition, May 25th to June 9th, in the Royal Agricultural Hall, will have a host of items of interest for our readers. Don't miss it.

For cleaning corroded half-tones flat cork is recommended to the printer's boy. Prevention is better than cure, and no half-tone should ever be allowed to corrode.

The "Norfolk" transparency drawing-film patented by Ozias Dodge is now being manufactured and sold by M'Caw, Stevenson & Orr, Ltd., of Belfast; and of Shoe Lane, London, E.C.

Honors in France. — M. Albert Groley, photo-engraver and wood engraver, has just been made Officier d'Académie, and M. Bouche, photo-engraver, has been made Officier de l'Instruction Publique.

British Blocks in the United States.— According to a correspondent of *The Engraver and Electrotyper*, no less than £8000 worth of blocks (mostly three-color) are imported into the United States each year from the one firm of Carl Hentschel, Ltd.

Trade Terms for Printers are the subject of a special push by the Globe Electrotyping and Engraving Company of Chicago. They supply printers with copies of "The Scale" with prices thereon at which cuts are supplied to ordinary customers, and from which discounts are allowed to the printing trade.

Money back if not pleased is the rather novel offer of the Herrick Press, designers and engravers, of Chicago, in connection with their catalogue of one-color and two-color stock cuts. Instead of giving the book free, they charge twenty-five cents for it, but return the money if you don't like the book.

Knowing the cost is not the only thing necessary in business. It is even more important to keep down the cost by efficient organisation and best possible methods. Some of the printing-trade critics suggest that in the anxiety to ascertain their costs to a nicety some firms have lost sight of the need for keeping those costs low.

Specimens without makers' name are offered by the Arthur Cox Co. to their printer-agents. Working for the trade, they prefer to issue their sample sheets in this way, instead of to the users of the blocks direct. They have recently done some good examples of three-color direct from the goods, for tradesmen's catalogues.

H. M. Cartwright, the author of an article on another page entitled "Photo-litho Transfers by the Bromoil Process," is also the original experimenter in the process described. He is one of the most promising of the many excellent students of the Bolt Court School, and two years ago he won the prize in the photogravure class which was given by *The Process Monthly*.

The wood engravers are the happiest men in the engraving business. They have more work than they can do, and at good prices —according to the Hawtin Engraving Company, of Chicago and St. Louis, which claims to be as big as all the other concerns in America combined. It has just opened very large new premises in St. Louis, at the corner of 6th and Chestnut Streets.

"PHOTO CHEMIE," by Dr. Joh. Plotnikow, of the Imperial University of Moscow (Halle-a.-S., Wilhelm Knapp), price M. 7.50. The most complete and authoritative exposition of the relations between light and chemical action that has yet been published, this book must, of course, be in any photographic library that aims at covering the subject, and must be in the hands of every thorough student.

HALF-TONES "FREE, GRATIS."—An ingenious customer has been writing to some of the half-tone firms—"If we submit photo prints will you make us cuts and submit prices and exact time upon which we can count on the return to us of the cut?" A charming scheme. If only a sufficient number of houses would each make a few specimens, free, there would be no need to buy any cuts for quite a long time.

METALLIC MECHANICAL OVERLAYS, as is well known, are a special patented line with the Arthur Cox Illustrating Co., who supply printers with the apparatus, materials, and instructions for making these splendid aids to perfect impression. To printers of fine half-tone work who have relatively small establishments they now offer a new "Midget" outfit, with full working rights, for six guineas. This is well worth investigation.

THE POSTAGE ON PERIODICALS weighs heavily in favor of the newspaper published at intervals of not more than eight days, and against the magazine published fortnightly or monthly. Many crusades have been waged against it without success, but that is no sufficient reason why the steps now being taken by Mr. Edward Owen Greening, of *The Agricultural Economist*, should not be successful. He asks for the co-operation, influence, and support of all interested in literature and journalism.

A NEW PHOTO-MECHANICAL DRY PLATE has been placed on the market by Hughes & Kimber. It is manufactured by the Paget Prize Plate Company. It is much more rapid than the "process" plates already on the market, a condition which has been attended with wooliness of the dots, hitherto. This the new plate seems to avoid very completely. It should be tried by all who use dry-plates in their process work. We hope to have further notes on its performance in a later issue.

THE DOUBLE MINIMUM.—Many efforts have been made to improve upon the principle of charging all cuts at a fixed rate per square inch with one minimum. Sessions & Co. tackle the problem to a certain extent by making two minima, first for blocks under six square inches, and second for those between six and twelve. Those under six inches are charged at the rate of about ten, whilst those between six and twelve are charged as for twelve inches.

WOMEN ENGRAVERS IN AMERICA.—In spite of the fact that women occupy almost every possible position that is open to men in the United States, it seems that they are unknown in the engraving business. One of our contemporaries says that two feminine process engravers arrived in the States a little time ago, tried hard to find work, but failed completely. Since then one of them has married, and she and her husband are suspected of the intention of starting a photo-engraving business with the still unmarried companion as manager.

"A SUGGESTION OR TWO CONCERNING ILLUSTRATIONS for Booklets, Catalogues, etc.," is the suggestive title of a little folder containing one vignetted half-tone from a pencil drawing, one two-color cut from an architect's drawing, and one three-color print from a water-color original. All these are architectural subjects, and are such as would be useful in the announcements of estate agents, auctioneers, architects, builders, etc. This specialising of announcements is to be commended. The folder is issued by Gatchel & Manning of Philadelphia.

PHOTO-REDUCTIONS OF LITHO TRANSFERS are a specialty with Alexander Wood & Son, of 10 St. Bernard's Row, Edinburgh, who reduce to any extent from subjects in any number of printings, guaranteeing the transfers to work well and to fit. Their pushing of this line amongst lithographers is one of the many proofs that this trade is rapidly grasping all the possibilities offered to it by photography. It also shows, and their business with all parts of the Kingdom confirms the fact, that it is just as possible to do "trade" process work for the lithographer as it is to make line and half-tone blocks for the letterpress man.

ALIEN IMMIGRANTS.—Some of our British blockmakers will feel surprised at being regarded in the light indicated by our side heading, but this is their fate when they arrive in the United States. *The Engraver and Electrotyper* says that the number of process men arriving in America is greater this spring than ever before, and that the International Process Engravers' Union has placed detectives at the ports of landing to check those who have come under an engagement with an American firm. It is against the law to import a man under contract, and *The Engraver and Electrotyper* states that some of the men on landing have been deported.

Paynetype is being handled in the U.S. by the Star Engravers' Supply Company, who have induced Mr. Stephen H. Horgan to assist them by demonstrating the process to some of the most important firms. Mr. Horgan is a firm believer in the great future for Paynetype; and not only some of the newspaper shops in small towns and cities, but even such great journals as the *New York Herald*, have taken up the method and found it quite satisfactory. The Star Engravers' Company points out that the sensitised metal plates cost from six-tenths to eight-tenths of one cent (three- to four-tenths of a penny) per square inch, and that the outfit for handling these plates (camera, Cooke lens, and cross-line screen) in 10 x 8 size will only cost $125 (£25) to anyone who has router, saw, and electric light.

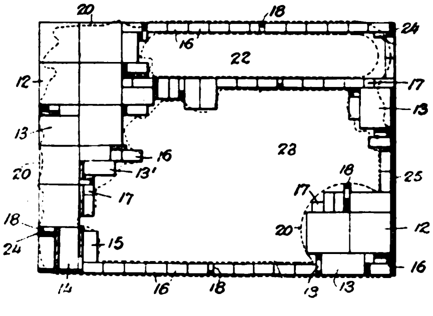
A plastic process, adaptable for many purposes, is claimed in a patent specification by Zacharias Olsson, of Upsala, Sweden. The claims vary a little. The fourth, which follows, fairly covers the principal items :—

"An improved process of producing objects from plastic material which consists in mixing gelatinous substances with a hardening ingredient capable of being energised by the action of light, incorporating with such mixture, prior to the hardening thereof, a substance capable of imparting to such mixture a coloration adapted to inhibit the chemical action of light, said coloring substance being in the proportion of from about 0·4 to about 1·5 per cent. of the dry weight of the gelatinous substance, and finally forming said colored mixture into shape prior to the hardening thereof."

Photogravure-effect litho is demonstrated in recent sample-sheets from the Litho and Offset Engraving Company, of 125 White Street, New York, to whom we referred recently as the first firm to be established specially for supplying offset-litho printers with process transfers. In the ordinary printing, with a single black impression, many of the subjects are very attractive, with clean highlights, solid blacks, and a long range of tones between. By double-printing, with an impression in light brown over the black, from the same forme exactly, the photogravure effect is obtained, and is very attractive, All the samples are printed on the Kellogg offset press, and they show very well the fine register it can give. Evidently there is to be keen competition in the immediate future between offset-litho and rotary photogravure.

The Dent Process Portfolio, No. 6, shows good selection as well as excellent execution, and covers the field of half-tone process very well. Two-color process for commercial work; two-color for catalogues; tri-color for book illustration; tri-color for art publishers; commercial tri-color; two-color for theatrical souvenirs; and half-tone from wash drawing, are the styles illustrated. Dents have long been known for magnificent technical quality, which has perhaps tended to be a little hard and metallic, certainly brilliant. They have emphasised this particular quality in their specimens. In the present selection, however, there are four which show their capability of handling more delicate subjects with sympathy and complete success.

Block Mounting: Sutherland's Patent. —The patent of John P. Sutherland, of Brooklyn, N.Y., is illustrated by a diagram of which we give a small reproduction, and elaborates the following claim :—" A mount for engraved plates comprising a plurality of different-sized supporting blocks of rectangular cross section and each of an area equal to that of a multiple of type units, said blocks being beveled at their upper and lower edges and provided with notches or recesses in the vertical edges thereof and with recesses in their side walls intermediate

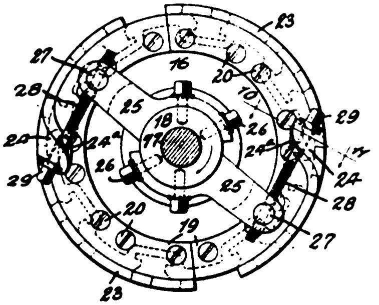


between the vertical edges, and clamping blocks of a height equal to that of the supporting blocks and each provided with an undercut overhanging finger engaging the plate."

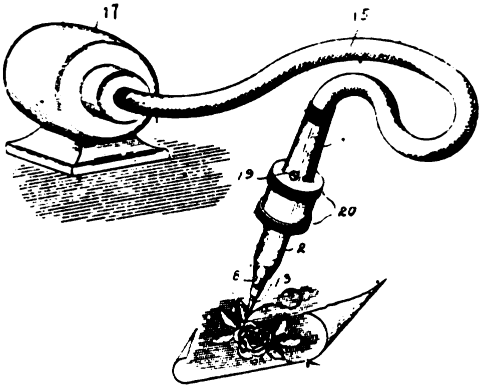
A PLATE-LOCKING DEVICE that has an indirect interest for process engravers and may have a direct one for machine-printed photogravure men is patented by Victor Filteau, of Montreal.

Without printing all his seven claims, which are variants of the same idea, we give the second, as illustrating the method, and reproduce the diagram from the specification:—

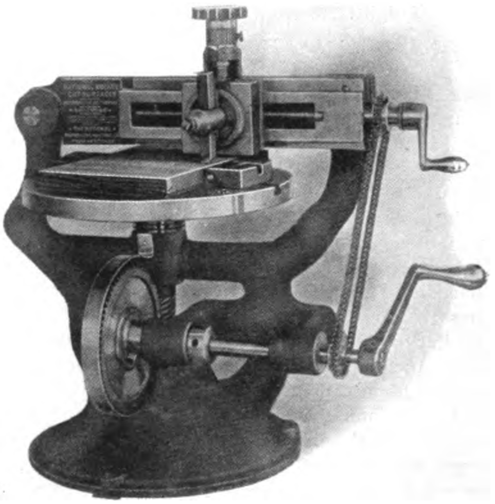
"The combination with a printing cylinder having plates therefor, of clamps engaging said plates, beveled faces on said clamps, a moveable ring having beveled faces co-operating with the beveled faces in said clamps, arms fixed to the cylinder, and screws pivoted to said arms for imparting to said ring a sliding wedge-like movement with respect to said clamps."



A PATENT PAPER-TRIMMER, claimed and illustrated by Roscoe Pierce and William V. Colthar, of Springfield, Ohio, is on the lines of the well-known dental drill and of the hand router introduced some time ago by J. J. Griffin & Sons, Ltd. The illustration is copied from the specification, and the first claim reads:—"In an implement for cutting irregular outlines in peper or similar material, the combination with an actuating motor and a flexible drive shaft, of a housing, a revoluble actuating head within said housing, having a central bore, and a cam groove in the inner periphery of said bore, a reciprocating plunger extending within said bore, a lateral projection on said plunger engaging said cam groove whereby the revoluble movement of said actuating head will cause a reciprocatory movement of the plunger, a stylus carried by said plunger and adapted to perforate the stock material in predetermined lines traced by said stylus, substantially as specified."



THE NATIONAL ROTARY CUT-SURFACER, introduced by the National Perforating Machine Company of Kansas City, Mo., U.S.A., is, in the main, described by our illustration. It takes any size of block up to 10 inches square or 14 inches diagonal, has micrometer adjustment of the cutting tool to $\frac{1}{1000}$ of an inch, has ball bearings to the base-plate, and weighs 110 lbs. The two last-mentioned points ensure steadiness and easy working. The block can be instantly placed, and clamped in place. No adjustment is necessary if the cutter has once been set and all blocks are needed of the same height. The larger handle moves the cutter across the wood of the mount, while the block revolves so that every part of the surface is trimmed true and level. It seems well worth while to have further particulars of this machine.



Estab. *Jan.* 1894.
"The Process
Photogram."

THE PROCESS ENGRAVER'S MONTHLY
THE PROCESS PHOTOGRAM ESTABLISHED JAN 1894

VOL. XVII. NO. 199.
JULY 1910.

Edited by H. SNOWDEN WARD, F.R.P.S., Founder of *The Photographic Monthly*.

A Supplementary Screen in Half-tone.

CARL RICHTER, of 23 Pelzerstrasse, Bremen, Germany, in claiming patent for a supplementary cross-line screen and its use, says:—

"In the preparation of half-tone negatives for photo-mechanical printing it is known to expose the negative first through an ordinary cross-line screen and then through a screen of different ruling.

"The present invention relates to improvements in this method, and consists in the provision on the second screen of covered spaces corresponding to the transparent spaces of the ordinary screen, and, in addition, smaller covered spaces connecting the corners of the large ones and forming transparent, uniform spaces between them. A considerable increase in the richness of tone of the picture is obtained by this arrangement.

"In the accompanying drawings, fig. 1 represents a view of the ordinary screen, and fig. 2 a view of the additional screen. The small covered spaces *a* of the additional screen are situated between the corners of the large squares *b*, which correspond to the squares of the ordinary screen. The number of covered spaces in the additional screen thus becomes twice the number of the transparent spaces of the ordinary screen.

"The negative is first completely exposed through the ordinary screen of fig. 1, whereupon an impression is superposed thereon by means of the screen of fig. 2.

"In consequence of the doubled number of covered spaces, of unequal size, contained in the additional screen, the employment of said screen at a second exposure of the plate, will result in the production of pictures the tone of which is particularly rich."

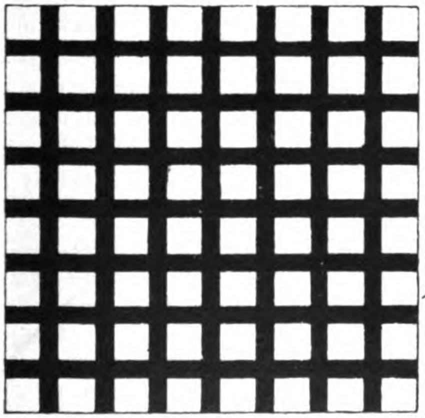


FIG. 1.

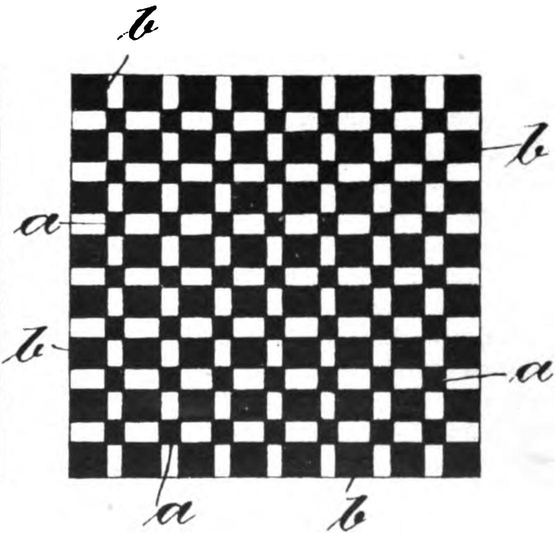


FIG. 2.

Fish-glue Enamels and Sensitisers.

A WAR of the glues seems imminent, for, after years of experimenting by various engravers and several commercial attempts to provide substitutes for the glue which has long held pride of place, there are now alternative glues which seem to be quite satisfactory. It may be interesting, therefore, to review briefly some stages in the history of the use of this colloid in photo-mechanical work. The bichromated fish-glue resist seems to have been used first in the United States, and British process workers first obtained it, with instructions for its use, from M. Wolff, of Dayton, Ohio, who was for years the most successful maker of half-tone screens, and instructor in half-tone and line processes. He did not divulge the nature of his resist, and his customers and pupils were not informed that they were using fish glue. Gradually one and another found that certain fish glues of the Russia Cement Co. of Gloucester, Mass., were more or less satisfactory for the purpose, but the fact was not published until the beginning of 1893, when articles appeared in *The Artist Printer* and in *Wilson's Photographic Magazine*, with a formula attributed to Mr. Hislop, a British amateur photographer, who had emigrated to the States not long before and taken up photo-mechanical work. The formula read:—Fish glue, 2 ounces; eggs (white), 2 ounces; water, 4 ounces: ammon. bich., 120 grains. This was first published in Britain in the issue of *The Practical Photographer* for April 1893, a magazine founded and edited by the editor of *The Process Monthly*. At once it was taken up by many process men, in addition to those who had been using the American "Enameline" as a secret process. Some were successful, others made failures; and it became evident that some unknown qualities of the many fish glues were probably responsible for the difficulties. When establishing *The Photogram* (of which *The Process Monthly* is a continuation) we felt that the enamel problem was the most important process question of the moment, and Mr. Charles W. Gamble, a member of the staff (now head of the photographic, photo-mechanical, and printing department of the Manchester Municipal School of Technology) undertook an investigation of all the distinct fish-glue products then on the market. Seventeen different brands were tested, and the most suitable was found to be Le Page's Liquid Glue, No. 20F, made by the Russia Cement Co. At that time this brand was only obtainable in cans of a gallon and upward, but we made arrangements for its supply in 1 lb. tins, and in the February issue (1894) of *The Photogram* published Mr. Gamble's method for its clarification. We corresponded with the manufacturers with a view to their placing a clarified glue on the market, with the result that they invited our editor to meet one of their principals in the U.S. to discuss the whole problem. They first needed to be convinced that the demand was likely to grow sufficiently to make a special article of manufacture worth entertaining. Then they went into the question of providing a fish glue which should be (*a*) non-acid; (*b*) constant in chemical and physical properties; (*c*) clarified from insoluble particles. As fish glue is made from the skins, fins, and other waste parts of fishes, the supply of raw material is very uncertain in quantity, quality, and time. A portion is very liable to be decomposed before it reaches the factory, giving rise to acidity, and in the ordinary method of manufacture it is commercially impossible to avoid the inclusion of particles of scales, fins, and other insoluble portions. Filtering is difficult, because of the viscous nature of the product, and clarifying by sedimentation and decanting takes a long time and gives a relatively small quantity of clarified glue, because the impurities are almost exactly the same specific gravity as the medium in which they float, so that they show little tendency to sink or to rise.

The method of clarification suggested by Mr. Gamble consisted of mixing the glue with albumen and water, and heating the mixture until the albumen coagulated. This it did around the insoluble particles, with the result that filtration became easy. The method was very satisfactory on the small scale for individual requirements, but it was considered too costly on a manufacturing scale, and the Russia Cement Co. decided to manufacture a glue free from insoluble parts, rather than be dependent on removing these afterward. This meant very careful selection of the raw material, expensive sorting and cleaning, and also the making and holding of stock for some time, because the particular materials decided upon could not be obtained at all times.

The first special fish glue for photo-engravers was lighter colored than the 20F, and was about half its density—a product for which engravers were enormously grateful. The troubles of the manufacturers were not over, however, for on more than one occasion they produced batches which appeared perfect in every respect, but which developed various difficulties after getting into users' hands, to the annoyance of the users and to the heavy loss of the makers. Moreover, the usual rule, that increased manufacture means reduced price, has not held good in this case, because the supply of raw material has not increased, and the sorting, to find enough to meet the greater demand, has become more expensive. Thus the price has risen more than once.

READY-SENSITISED GLUES.

The advantage of supplying a standardised and complete article is obvious, and the Russia Cement Co. recognised it long ago. They made their own experiments and consulted with some of the best authorities with a view to producing a sensitised enamel ready for coating. Several other people did the same, and more than one very promising product has come upon the market. Three difficulties have faced the workers on these lines:—(*a*) many process printers like their own formula, or their own particular fluidity of enamel; (*b*) the ready-sensitised enamels tend to become insoluble in course of use; and (*c*) the enamel for use contains much more water than the fish glue that one has been in the habit of using. Probably (*c*) is the most important difficulty and the one which most strongly weighs against the success of prepared enamels. For increased bulk means increased cost in carriage—an important item in our own country when the place of manufacture is across the Atlantic, and much more important in countries and colonies even more distant from the source of supply. It may be possible to prepare a sensitised fish glue without any change in its concentration, but in that case it would be necessary for the user to dilute it with water; and if he does so much, why not add the chromic sensitiser at the same time?

NEW FISH GLUES, OR SUBSTITUTES.

In a craft so full of the spirit of investigation as our own there are always experimenters, and many suggestions have been made for improving the fish-glue formulæ, finding a substitute for Le Page's glue, or a substitute for fish glue altogether. Some success was found in the use of seccotine, and experiments with this material led its manufacturers, Messrs. M'Caw, Stevenson, & Orr, to place upon the market through J. J. Griffin & Sons, Ltd., Cotine (omitting the first syllable, "Sec," of the name of the original article). This appears to be a perfectly satisfactory product, working excellently in every way, yet some members of the trade complain of difficulties in its use. We do not think that these have arisen from carelessness or incapacity on the part of the workers, and it seems desirable, in the interest of the manufacturers as well as of the craft, that the reason for the trouble should be stated. This, we believe, was the rather premature issue of the material before all its vagaries were fully known. The first issues were excellent; then following the old experience with the original fish glue, there were difficulties in the way of a perfectly regular, standard manufacture. We believe that these have been overcome entirely, and that any of our readers who may have been disappointed with a sample of Cotine, can now use it with full confidence.

VAUGHAN'S SENSITISING SALTS.

Mr. Frank Vaughan, of Liverpool, one of the pioneers in process work, has discovered a method of sensitising the fish-glue enamel, with certain salts additional to bichromate, for which he claims distinct advantages. This was first announced privately, and several firms took up its use, with the result that early in June Mr. Vaughan spent a few days in London, demonstrating his method to those who expressed interest. The first advantage is a reduction in printing-time; this has caused the method to be taken up by several newspaper shops, to whom it is even more important than to the general trade. The saving in time and in electric current is very material—quite 50 per cent. The enamel can be used on either zinc or copper, prints in 1½ to 2 minutes with an enclosed arc 10-ampère lamp, burns in, to an intense black, at a temperature lower than is needed for the ordinary enamel, and stands etching to the finish, even on zinc, without any rolling-up.

The formulæ recommended are 80 grains of the special salts and one ounce of fish glue or Cotine to three ounces of water for zinc or four ounces for copper, and the inventor points out that each worker may modify the viscosity to suit his own taste, so long as the proportion of salts to glue remains constant.

A small license fee is charged for the right to use the new salts, and the salts themselves are supplied by Mr. Vaughan.

THE EXHIBITION OF THE SOCIETY OF COLOR PHOTOGRAPHERS at the rooms of *The British Journal of Photography* gives rise to rather mixed feelings. While there is plenty of evidence of the value of more than one process for making colored originals, there is also a large proportion of helpless, hopeless experimental work, and some which simply shows that some people go into color photography without the slightest notion of harmony in coloring. Perhaps the most interesting of all the exhibits is the collection of works by Mr. Edgar Clifton's modified process of three-color superposition. These seem to have all the good technical qualities that can be desired in a three-color proof for reproducing prints. Generally speaking, however, the transparencies are much more successful than the prints on paper. The number of exhibitors of Autochromes show that they have well mastered the very beautiful process; a similar collection of transparencies on the Dufay plate included some strikingly brilliant and harmonious results, especially good in the rendering of flesh tones; and the Thames color plate also was represented by some very good examples of work and by many exhibits of great technical interest.

("The Process Photogram.") July 1910

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Damaged Half-Tones and their Repair.

A lecture delivered to the Vienna Graphical Society by Ludwig Floimair.
Translated from "Graphische Revue Oesterreiche-Ungarn."

By half-tone blocks we understand, as is generally known, printing-blocks made by photochemigraphical means, with the aid of a screen, which is used for the purpose of dissecting the half-tones into printable elements. As only points and lines are printable, half-tones have to be reduced to such if they are to be printed. The wood-engraver dissects them by means of the graver into suitable groups of lines. Photomechanical reproduction has recourse to the ruled screen whenever originals have to be rendered which are not drawn in lines or dots, as, for instance, photographs, paintings, etc.

The first experiments for producing network etchings were made by Talbot as early as the year 1852, but the present high degree of capability was only reached in the eighties by Angerer & Goeschl in Vienna, Meisenbach in Munich, and Ives in the United States. To-day the half-tone block has almost displaced the more expensive but artistically more valuable woodcut, and is used throughout the world as the only means of illustration.

Photographing through screens is work which demands a great deal of experience. The so-called wet process is almost exclusively used for this purpose, of which it would, however, lead us too far to give a detailed account here. A description of the arrangement of a photographic camera is surely likewise superfluous. Suffice it to say that the camera for reproduction must be made large enough (one of the largest measuring 100 x 100 cm. is owned by the Graphische Union) and fitted with rails and movements which permit of the most accurate adjustment, with appliances for shifting the screen up to or away from the sensitised plate before which it is placed, and finally with a board to hold the object, mounted upon one end of the supporting framework. Upon this board the operator fastens the original to be reproduced, and adjusts the focussing-plate until he has a sharp image of the required size. Then he inserts the dark slide with the sensitised plate, fixes the ruled screen nearer or farther according to its coarseness or fineness, and finally removes the cap from the objective, thus exposing the sensitised plate to the rays issuing from the original. Whether the negative be a success will depend entirely upon the sufficiency of the exposure and the accurate observance of the other conditions. Taking the exposure as successful, the operator conveys it to the dark room and develops it. Thereupon the photographer examines the negative with a strong magnifier to ascertain its fitness for further treatment. We will assume that it is fit, that the picture is successful. It is then fixed and subsequently intensified; in other words, the picture which has by the interposition of a ruled screen been dissected into dots and crosses must be subjected to a special treatment in order completely to cover these dots. This is quite appropriately called "strengthening," and is generally effected by flooding with a copper or lead solution. The plate, which has become white in the process, is subsequently blackened with ammonia. After drying it has to be insulated with indiarubber, then it is washed with collodion to thicken the film, placed in a hardening-bath, and finally drawn off from the glass. Therewith the photographer concludes, generally speaking, his share of the work, and the metal printer begins his. A zinc, brass or copper plate is coated with a bichromated albumen or fish-glue solution and whirled in order to secure even distribution. Upon this the film of the negative is pressed and then exposed to the daylight or electric light. After sufficient lighting the printer in the dark room removes the film from the plate, inks up the latter, and places it in water. Slight rubbing with a pad of wadding will remove the ink again except from those parts where there were transparent dots in the negative permitting the light to affect the film. These will retain the ink, and the metal plate can now be handed over to be prepared. It will first be carefully dusted with asphaltum, cleaned with wadding until all that is superfluous has been removed and only the covered parts of the plate retain the asphaltum. Then the plate is heated until the adhering asphaltum dust is melted and thus forms a well-covering layer which is capable of resisting the acid.

The plate is now handed to the retoucher, who repairs any faults, rules the border line with asphaltum-varnish, and finally passes it to the etcher, upon whose efforts the success or failure of the whole work now depends. The plate is etched either by means of an etching machine, of which there are quite a number in existence, or placed in a bath of nitric acid for two or three minutes, and washed and dried. The etcher then stops out black parts, the deepest shadows, with asphaltum-varnish, or rolls them up, and after drying continues to etch the plate for some seconds or minutes as the case may be. Very often a plate may be stopped out six or eight times until the desired result, the requisite depth, the effect corresponding to the original, has been achieved. A proof is now pulled on a hand or glazing press and compared with the original, and if necessary the plate is further etched or retouched with the graver.

Herewith I have reached the most important part of that which I really purpose to demonstrate. The block is finished; it is handed to the customer, or rather to the printer. But it is an extremely sensitive thing. The whole plate is covered with a network of dots, very delicate in the lights and no less susceptible in the shadows. The printer cannot, as the saying is, put it in a glass case; it is exposed to many risks, and even with the greatest care is bound at times to suffer injury. And now, what remedies are there? "Prevention is better than cure," the old proverb has it: I might apply it to my theme and say, It is easier to avoid injury than to mend it. And in this regard I hope that my well-intentioned advice may be followed. If, in spite of everything, damage has been done, I will indicate how you may be able by the simplest means, yet in a genuine workmanlike manner, to help yourself. Above all things, however, handle your blocks with conscientious care! Never let them be piled up without placing blotting-paper or soft card between them, as grains of dust or other foreign bodies might easily damage them or fasten between the dots. Again, it may prove very injurious to leave the blocks lying about on tables, in formes, without a protecting cover. Quite apart from such accidents as the dropping of tools, keys, or other material, there is always dust in plenty to settle in the fine lines, and an odd drop of water will be quite sufficient to cause a little spot of oxidation. Indeed the ordinary moisture of the workshop or in the store, the removal through cold air into warm rooms, will be quite enough to cause such oxidising. Even a mere touch of the finger will leave its imprint upon the polished surface, and sweaty hands have often caused trouble in this way. Every observant person must have seen that such sweat-marks take the ink very badly, certainly much slower than the other parts of the surface, and as it were with repulsion. Every block should be thoroughly greased with vaseline, and never left with ink upon it, as this quickly dries and thereby affects the depth and fitness of the block. Color-blocks in particular are affected by this. After they have been washed with turpentine or benzine it is advisable to dry them thoroughly by dabbing—*not rubbing*—them with doeskin or tissue-paper. Most of the various kinds of cleaning-cloths leave fluff behind them which is not easily removed, in most cases only with aid of the graver. Old blocks should be dismounted, thoroughly washed with turpentine, and dried with sawdust; a subsequent washing with caustic potash and whiting will generally remove all old dirt and dry ink. The surface may be injured by the use of too stiff a brush, or by the brush slipping and striking it with the wooden back, by a projecting binding-wire, or in some such way. If the resulting scratches show up white in the print the printer need not be too much startled. He can remedy the defect. There needs but a little manipulation, a slight knack.

I will endeavor in the following to elucidate this as intelligibly as possible. Before everything it will be necessary to learn the right way of holding the hand in guiding the graver. As shown in fig. 1 the graver should always be held so that the handle rests against the ball in the hollow of the palm. Fig. 2 shows the position of the fingers against the handle and the graver to secure a firm hold, the thumb forming merely the guide, or, as it were, a fixed "ruler." At work the thumb is obviously held as shown in fig. 1. In order to remove faults from light or white places, open tones (air, snow, etc.), take in the case of a fine screen a "tint" graver No. 1, with coarser screens Nos. 2, 3, or 4; draw it back slightly to let it drop between the dots, then with a slight pressure drive it forward over the black patch (fig. 3), repeating the process, adding line to line until the fault has disappeared. Do not cut far beyond the

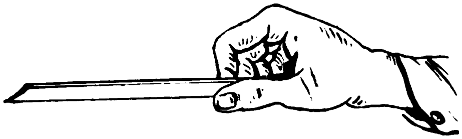


FIG. 1.—Holding the graver.

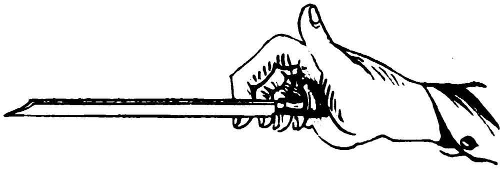
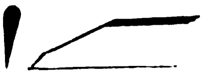
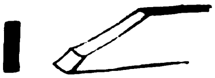
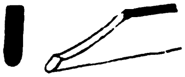
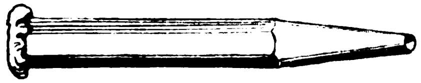


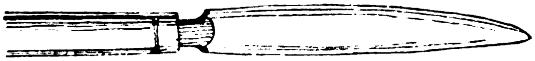
FIG. 2.—Position of the fingers on the handle.


"Tint" graver.


Square-pointed graver.


Oval-pointed graver.


Punch for hammering out damaged places from behind.


Burnisher for strengthening shadows.

actual fault, as in case the graver does not fit accurately you may make white patches. Should this have happened, however, slight pressure with a square pointed graver No. 42 (Vautier) drawn backwards (fig. 4), will suffice to broaden the dots to approximate them to the others. To test the success of the operation it is best to blacken the plate or to rub in burnt magnesia. In cases of damage, where a hard object has fallen upon the plate and depressed or injured the dots, a slight pressure with the "tint" graver No. 1 or 2 against the depressed dots will bring them to the printing level. This procedure is shown in fig. 5, which indicates how other sound dots are to be avoided in the course of the graver to prevent injury to them. The arrows show the direction of the graver. A knock or cut in the shadow of the picture may be mended by lifting up dots, making the cuts for the raising according to fig. 6. When the metal has been raised above the printing level, depress it as in fig. 4 with a somewhat more vigorous withdrawing pressure of the square-pointed graver, thereby squeezing the jagged edge into the cut. As soon as the printing surface is smooth enough (a little assistance may be given with emery paper 0000), white dots are cut to match the ruling of the screen, and the result will be found to be satisfactory. In the case of slight scratches it will often suffice to use the graver as in fig. 4 without raising the metal, as there is usually a ridge formed which it is quite easy to smooth out. Sometimes it is even possible to remove slight scratches with very fine emery paper or limetree charcoal. It must be remembered that the square-pointed graver must always rest perfectly horizontally upon the plate, never at an angle, otherwise either of the points can easily cause fresh and more penetrating injury (fig. 7).

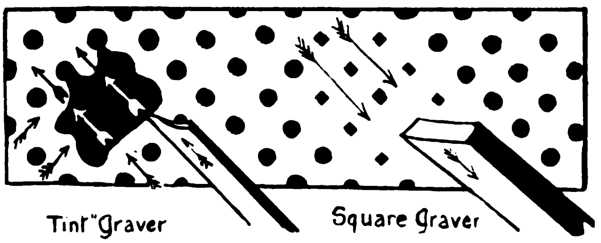


FIG. 3.—
Cutting through black patches.

FIG. 4.—
Darkening light places.

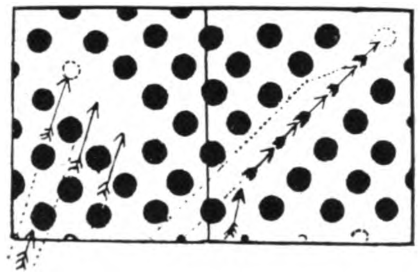


FIG. 5.— FIG. 6.—
Raising the dots, and direction of graver.

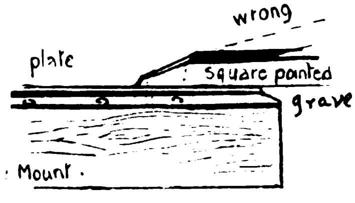


FIG. 7.

(*To be concluded.*)

Rotary Newspaper Photogravure.

DR. MERTENS' machine for printing photogravures is described in a recent issue of the *Deutscher Buch- und Stein - drucker.* It differs from the ordinary machines for printing sanitary wall-papers, principally in the fact that instead of the impression roller being covered with a blanket there is an intermediate rubber-covered roller of relatively small diameter. The impression cylinder presses this rubber roller on to the back of the paper, pressing the paper against and into the depressions of the printing cylinder. There is a cylindrical brush in the ink duct to stir the ink and carry it to the wood roller which applies it to the printing cylinder. The "doctor" or scraper for wiping the printing cylinder is of steel, 2½ mm. in thickness and 8 to 10 cm. broad. It reaches some distance beyond the printing cylinder and has a continuous lateral motion to and fro. The doctor is kept smooth and bright during the printing by a simple polisher. The writer has operated the machine at a speed of 6000 revolutions an hour without any stoppage or difficulty. The cost of production of the printing rollers is not higher than an equal area of half-tones together with the necessary curved electros for rotary printing. The printing roller is an iron cylinder covered with copper by electro-deposition to thickness of 0·6 mm. After printing, the copper is dissolved off, and the roller recoated.

The cylinder is coated with a light-sensitive resist and printed under a celluloid transparency. There is no make-ready, which means a saving of time as compared with fine half-tone printing.

The time-table suggested for a paper with three or four pages of pictures is, in the case of half-tone:—At noon the etcher gets the last half-tone in hand; at 2 o'clock the last page is in the hands of the electrotypers or stereotypers; about 5 or 6 o'clock the curved plates are ready to put on the machine; about 10 to 11 o'clock the making-ready is finished, and by 11.15 the printing is commenced.

For the Mertens process it is contended that the time formerly used for making the half-tones is employed in preparing the photographic positive. The composing-room can deliver the last page at about 5 to 6 o'clock. At 6 o'clock the picture rollers are taken in hand, and are ready by 10 o'clock; from 10 to 11 o'clock finds the text formes made ready, and by 11.15 printing commences. Thus the editorial department has four hours more to get in late matter. There is also the saving of the cost of make-ready.

A further consideration is the saving in the cost of paper. An illustrated journal now using calendered paper for half-tone printing can use a paper at least 8 pf. per kilo. (about ½d. per lb.) cheaper. Taking 1000 kilos. of paper as used for each number, there is a saving of 80 marks, or £4. This would soon pay the cost of the machine and licence.

On the other hand, it is necessary to damp the paper before printing. It must be unrolled the day before, and as the news paper is very dusty, it is passed through a pair of brushes before going to the damping trough. The unrolling of a large roll of paper takes about ten minutes. Where regularly used the paper can be delivered damp from the mill.

The etching of the picture rollers does not require any great skill. The wearing of the rollers is very slight. Rollers have given 60,000 to 100,000 impressions without showing any variation or wear.

The Printing Trades Exhibition.

John Swain & Son Ltd
JOHN SWAIN & SON LTD.
PHOTO ENGRAVERS & ART REPRODUCERS BY ALL PROCESSES
London Manchester Glasgow Paris
NEW OFFICES & WORKS COLUMBIA HOUSE 89 90 Shoe Lane & Fleet St
108

ONE of the best organised trade exhibitions that England has ever had was the Printing Trades Show in the Agricultural Hall during the last days of May and the beginning of June. A very generous share of the success was contributed by the process engraving trade, which plays such an important part in modern printing. Amongst the many interesting exhibits it is difficult to say which attracted the greatest amount of notice. The typesetting and casting machines were very popular, and rotary offset printing came in for a large share of attention, but probably the most popular show in the whole great building was that for which the Arc Engraving Company, Ltd., and A. W. Penrose & Co., Ltd., were jointly responsible. This was nothing more nor less than a complete photo-engraving plant in full operation. Fitted by Penrose & Co., it was a triumph of perfect equipment, and excited the wonder of certain visitors who were photo-engravers in the early days but who abandoned the craft ten or more years ago. Progress has been so gradual and constant, in spite of its rapidity, that those who have been long in the craft do not notice the immense strides, as those do who have been out of it for a while.

WORKING PHOTO ENGRAVING PLANT
PENROSE & Co. LTD
The ARC ENGRAVING Co LTD
MAKERS OF BLOCKS BY ALL PROCESSES
LINE HALF TONE THREE & FOUR COLOUR &c. &c.
LEEDS

Representatives of Penrose & Co. were almost always in attendance to explain the apparatus and machinery, which was being worked by a staff provided by the Arc Company. Mr. G. Gilbert Huggins, Managing Director of the Arc Engraving Company, was in charge, and under him Mr. Haider as general manager, with Messrs Parker (operator), Constable (enamel printer), Stone and Padley (etchers), King (engraver), H. Mason (mounter), and Boothby (pressman).

Some very interesting anecdotes and experiences were connected with this stand, as, for instance, that the Lord Mayor's party was snap-shot on arriving

A·E·DENT & Co LTD. ENGRAVERS·
A·E·DENT & Co LTD.
PROCESS ENGRAVERS IN HALF-TONE & COLOURS.
A·E·DENT & Co LTD.
4
TRYDENT
A.E.D. & Co
Broadway E.C.

at the hall; and when they came to the Penrose-Arc stand the Lady Mayoress spontaneously recognised her daughter's portrait in the job then in progress.

An interesting frame at the entrance to the stand contained a proof of the first tri-color plates made in England with collodion emulsion (in 1897) and of half a dozen three-color covers of *The Ludgate Monthly*, published in 1897 and 1898.

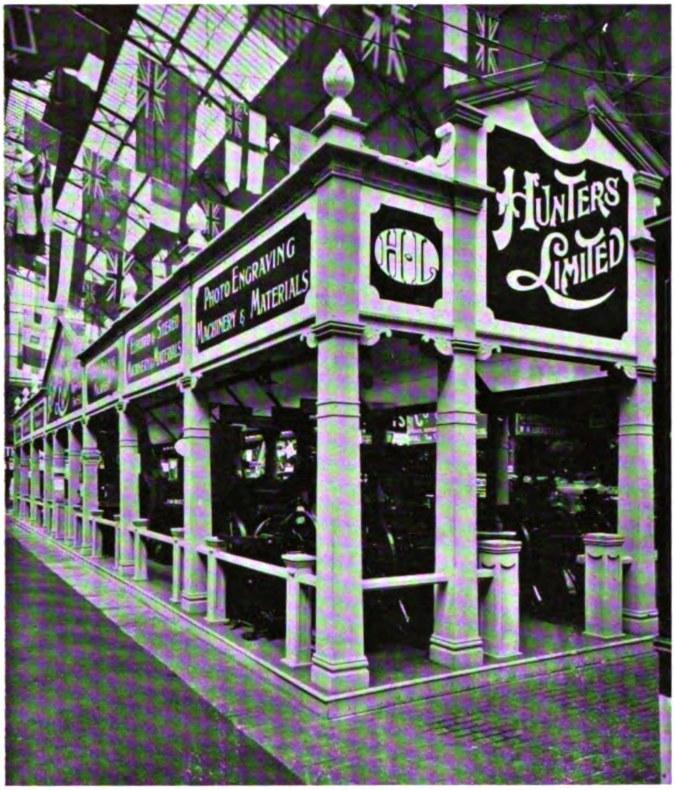
The first photo-mechanical firm encountered on entering the Exhibition was John Swain & Sons, Ltd., specialising on three-color reproduction from autochrome originals and on half-tones specially prepared for offset litho, of which they were distributing a very good example, printed by W. W. Sprague & Co.

Other examples of the offset litho work of W. W. Sprague & Co. were to be found in the gallery, and also in the very effective six-color job distributed by Morris & Bolton, Ltd., to advertise their offset litho inks.

Offset litho was altogether wonderfully well represented, for the Mann, Hoe, Potter, Harris, Rubel, and the Waite and Saville presses were all to be found at work — surely good evidence of the important place that has been taken by this newest of adaptations of a method already long in use for printing on metal.

To return to the photo-engravers. A. E. Dent & Co., who have probably made as good use of the exhibition as any process firm, were again at No. 4 with a tasteful, inviting frontage, leading into a cosy office where things could be discussed and planned.

The Anglo Engraving Company, Carl Hentschel, Ltd., and the Arthur Cox Illustrating Company, all had ample stands, with varied and convincing displays of specimens and with courteous,



capable attendants who seemed to take the greatest possible interest in giving all the information in their power.

Photogravure — so far as the home country is concerned — was represented by the Art Reproduction Company with a few fine examples of color-printed gravures, and Allen & Co., Ltd., who had a large and most interesting stand devoted to the various applications of the Intaglio process. Catalogues of stock lines in photogravures from copyright and standard pictures, for use as calendars, subjects for framing, Xmas cards, etc., were supplemented by many examples of the prints themselves. Allezogravure, the machine-printed photogravure of this firm, was well represented, and to prove that it could be printed on news paper there were many impressions on the blank spaces of copies of a morning newspaper.

Hunters, Ltd., had a large number of interesting items, in printing machinery as well as in photo-mechanical matters. A large oil-painted portrait, or so it appeared, was shown as a print from the largest set of four-color blocks ever made. They were 40 × 27 inches, made by Bruckmann, of Munich, with Haas screens, and the result was a triumph of quality as well as size.

A complete outfit for photo-engraving was included, amongst the items of entire novelty being a swing camera-bed and a vacuum printing-frame. The camera-bed is all of iron, built like a bridge, carrying the lamps (so that floor and ceiling are kept clear of lamp-attachments) and providing for universal motions of camera, copy, and lighting. We describe and illustrate this bed on p. 168, also the vacuum printing-frame, of which the special feature is a patent self-sealing rubber edge to the vacuum blanket. This does away with the necessity for great pressure on the edge of the blanket, or for the alternative of some liquid to make a perfect seal.

The Aerograph Company had a large display in a prominent position, showing the modern applications of the air-brush and making a specialty of stencil-work.

British litho stones and work done thereon were shown by the British Litho

Stone Company and the United Stone Firms, Ltd., both drawing their supply from the quarries at Keinton Mandeville, the stone from which has only been proved satisfactory for litho purposes during the present year. Their interest for most process men is only indirect, but another litho-material exhibit, Stolithol, claims special advantages for the very finest work, particularly in fine offset work, as an ink-doctor for keeping the work clean and bright.

The exhibit of Algraphy, Ltd., was, of course, full of interest for the litho-process man.

The gallery contained more work than we have space to mention, even briefly. Schelter & Giesecke of Leipzig; Angerer & Göschl, Vienna; Georg Büxenstein & Co., Berlin; and the Lehmannsche Buchdruckerei, Dresden, all had fine displays of color-work. W. J. Bruce & Co., art publishers, made a large display of Continental color-work by the Frey screenless process, including a number of carpet reproductions from Autochrome plates. Other displays of color-printing were by the Menpes Printing Co., Ltd., including some of Mr. Mortimer Menpes' series of Great Masters; Thomas Forman & Sons, Nottingham, and Hamel & Co., Nottingham.

An extensive and valuable educational series was shown by the London County Council School, Bolt Court; and the Heriot-Watt College, Edinburgh, contributed good specimens from the photo-engraving classes instructed by Messrs. W. B. Hislop and J. G. Wylde.

This incomplete and imperfect survey of the Exhibition must not close without some notice of the enterprise of the Carlton Studio, 195 Strand, W.C., in making a very large, complete, and attractive display of designs for reproduction. The work was full of ideas and novelty, with strong design, accurate drawing and effective coloring. Altogether a very worthy show by a firm which produces for reproducers.

The Original Patent for an Etching Machine.

Patent No. 247,745, dated May 28th, 1895. Granted in Paris to A. M. Truchelut, "for a general process for engraving on all substances." Translated from the French patent.

THREE processes are known at present for engraving or cutting on metals, marble, stone, ivory, etc.

The first consists of removing with the aid of a graver, chisel, or abrading substance the part to be engraved. In the second, chemicals, such as acids, are used, whose solvent action produces a more economical but less perfect result. The third, already covered by many patents, consists in mechanically projecting a hard powder against a friable substance, such as glass or marble, which cuts into them and produces by a great number of microscopic cuts very deep engraving in a few minutes.

This last process, which is the most advantageous, but can only be used on friable substances, as we have just said, is not practical on malleable substances such as metals.

We have been able to arrive at a good result by combining this wearing action with a solid or liquid ingredient capable of producing a solvent chemical action on the object to be engraved, in the manner of the acid engraving, already mentioned. By these united actions the chemical substance produces its effect most easily, the part to be engraved being continually cleaned and worn upon by the sand.

Having mentioned the principle of this discovery, the shape and size of the apparatus can be varied infinitely; it is only a matter of projecting a powder and an attacking chemical substance on the substance to be engraved. This powder can produce the two effects simultaneously.

For instance, perchloride of iron when projected forcibly on copper produces a very quick solvent action.

Chemists will know that we cannot dogmatise on powdered substances which have a chemical action on materials to be worked on when damp. These powders and materials vary infinitely, as every chemist knows.

Combined with inert substances such as sand, emery, etc., we can use the same solvents as are employed by actual engravers on similar materials.

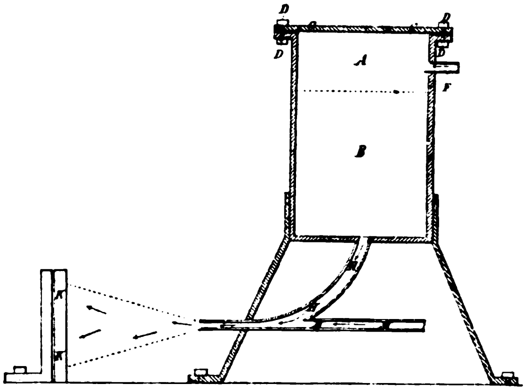
As another instance we may take azotic acid for zinc and copper; nitro-hydrochloric acid for steel, gold, silver and platinum; hydrochloric acid for aluminium, horn, ivory and marble; potash for wood; hydrofluoric acid for glass, slate, granite, etc.

We repeat that any chemist knows all the solvents suitable for engraving.

We can always use as a resist such processes as albumen or bitumen, and all processes actually in use by engravers for lithographic or typographic work. We show in our cut the apparatus which we actually use, and which has given us good results. This consists of a vat A B, constructed on a self-regulating basis. By raising the cover C we introduce the substances already described; and replace the cover, fastening it by means of the bolts D D.

Compressed air is let through the pipe F, which helps to facilitate a damp mixing of the chemical product. It leaves the vessel by means of the tube H H, at the lower end of the apparatus, and is forcibly projected against the object to be engraved, placed at the point K K by means of a stream of compressed air forced rapidly through the tube M M.

Under these conditions the sand and the acid are continually renewed. It is evident that the stream or jet can be projected vertically, horizontally, or up or down on the object to be engraved.



An addition was made a year later:—

"After taking out the above patent I made numerous experiments on the process of engraving. I have used the most varied substances for arriving at the best results; searching for active solvents which, when projected violently against the surface to be engraved, produce an action which is both mechanical (grinding) and chemical (solvent).

"It is the effect of the damp mixture described in detail in the patent, but I have proved in my researches that sometimes I can dispense entirely with hard powders which I use to mix with the liquids. Under very high pressure, liquid alone, projected on the substance to be engraved, works in a mechanical manner and removes particles, at the same time dissolving the surface chemically.

"In consequence I can engrave according to my new process without combining a powder with the solvent."

Dangers of Machine Etching.

A PARAGRAPH in our May issue, intended to allay certain fears, appears rather to have aroused them, if we may judge from a letter received just too late for insertion in June. To make the matter more clear we reprint the original paragraph:—

> "Death in the etching machine" has been the cry in one of the great American newspaper plants which has its own process department. Three deaths are alleged to have arisen directly from working in the rooms with the etching machines, and the difficulty in securing workmen to face the conditions forced an investigation. The conclusion seems to be that while the deaths in question were not, or were only in small part, attributable to the working conditions, those conditions are not good. The etching-room is in the basement of a sky-scraper building, three stories below the earth-level, and the ventilation is insufficient to carry away the acid fumes. This is a most important consideration, which should be thought about when planning any place for an etching-room.

While this is a condemnation of insufficiently ventilated etching-rooms three stories below ground, it is a vindication of the machines *per se*, and we took it as evidence that the allegations made against the machines were misdirected.

Our correspondent, "Machine Etcher," assumes (we know not why) that the plant in question was in Chicago, and Mr. Gamble accepts this assumption, but the point is not very important. "Machine Etcher" also assumes that the American acid blast was the machine in use. There are several forms of etching-machine in use in America.

While the correspondence raises an

important point about one particular machine, the discussion of which is well left in the hands of "Machine Etcher" and Mr. Gamble, it draws us away from the really vital matter, the ventilation of the etching-room. However good or bad a machine or an open tub may be, its results are utterly and entirely bad if the fumes are ultimately collected in an ill-ventilated room where men are working. We have seen an etching machine "ventilated" by taking a chimney or air-shaft to just inside a window which was left slightly open at the top, and from which there was a steady draught *into* the room. The room was a basement, and was in England—London, in fact. We have also seen a "tub-chamber," placed in the middle of the one long room which accommodated all the departments of a process shop, with a "ventilating" hood that simply rose to within some four or five inches of the boarded ceiling, and there opened into the room.

The question is not a matter of one form of machine *versus* another, or of machine *versus* tub-etching, but of ventilation conditions. Dozens of deaths were attributed to the bad conditions in some of the old tub-etching rooms; and much of the trouble was laid to the carelessness of lads who spilt acids on the floors. This may be seen in many reports and paragraphs spread through the last three or four years of this magazine. One, at least, of the designers of etching-machines (Mark Smith) was led into his experiments by a desire for something less harmful to the workers than the old open tub; and the advantage from this point of view has been long before the mind of Louis E. Levy, who designed the acid-blast machine. Any manufacturer, if convinced that his machine was faulty, would remedy it with pleasure, for, undoubtedly, the making of a machine to deal with its fumes satisfactorily is not a very difficult problem. But it is important that machine-etching generally, or any particular machine, should not be condemned for faults in the construction of the building or the etching-room.

In order to deal with the subject *pro* and *con* in one issue, we sent a proof of "Machine Etcher's" letter to Mr. Wm. Gamble, and both the letter and the reply will be found below:—

The Editor of "The Process Monthly."

"Death in the etching machine" is an alarming "Brevity" of your May *Process Monthly*, and will possibly cause a mild stir among process workers of this country, where machine etching is becoming so popular.

In my opinion this is an item deserving of more than a cursory glance, and one could wish that it had received more detailed treatment. In spite of the more or less reassuring "investigation report" there are various points on which no doubt English etchers would welcome more light.

The few brief facts mentioned are that three men of one newspaper staff have recently died after working some time in a room where etching machines were operated; that the room was some three floors below the ground level, and that it was not sufficiently ventilated to carry off acid fumes. We certainly get the disagreeable impression that the acid fumes played an important part in the death of these men, but whence the fumes? Was it the custom in this shop to leave strong acid in open vessels, or were the fumes discharged from the machines? If the latter, what kind of etching machines were used? Now, as the plant in question is located in Chicago, I take it there would be a strong presumption that the American acid blast would be used, but of course this is merely a presumption.

I cannot conceive of a Chicago newspaper proprietor installing an etching plant with "open etching baths" three floors below the ground level without at least a strong ventilating fan. I can, however, conceive of such an employer, who has seen the various booklets and advertisements on "blast etching," coming to the conclusion that for such a subterranean etching room nothing better has been devised. For does it not carry away all injurious fumes? and indeed taking its supply of air from the room itself causes a continual renewal.

Undoubtedly these conditions are fulfilled with the "blast machine" when properly manipulated, and *only* when properly manipulated. It is my contention that unless this machine is operated with a correct limitation of air pressure spray etching must be highly injurious to the worker. It would, however, be most interesting to know how many of the record etchings of "flats" of line work (plates etched in twenty minutes) have been accomplished under fair and healthy conditions.

From your excellent magazine articles and numerous advertisements, no doubt most etchers are more or less familiar with the type of machine in question. It may not be out of place, however, to very briefly mention the principal features.

The etching chamber proper is fitted with a series of aspirators through which air is forced, thereby drawing up acid and throwing it in the form of a fine spray on to the face of the plate to be etched. These aspirators are operated by a "high-pressure blower," which develops an air pressure of about 2 lbs. Now it is intended that only about half of this pressure should be admitted to the aspirators, and that the remainder should go through an exhaust pipe. It is also arranged that the blower takes its supply of air from the etching chamber, otherwise of course the spray-laden air would escape into the room.

I find in practice that if such a machine is worked at a pressure exceeding ¾ lb., there is a decided escape of acid into the workroom. It must be borne in mind that between "open bath" etching and "blast etching" there is a vast difference. With the "rocking bath" method of etching, acid fumes do certainly permeate the atmosphere, but they are weak; and I think experience proves that with reasonable ventilation they are not very harmful. But with "blast etching," in the absence of experience I cannot resist the temptation of theorising on the effects of working in a room where machines are discharging volumes of acid spray, actual globules of raw acid. I cannot but submit that this *must* be decidedly injurious to one's health. And that these conditions do exist I feel convinced, for no such machine I have seen has any checking device to prevent the working valve being opened beyond a healthy pressure; and further, it is practically impossible for a man working at high speed to resist the temptation of putting on the pressure. So convinced by actual experience am I of this, that I feel sure the batches of line work done on this machine at a healthy pressure, or I may say under healthy conditions, are the rare exception. I will indeed go so far as to suggest that a check on the valve to prevent its being opened beyond ¾ lb. pressure should be a compulsion of law.

The flat of line work etched in twenty-three minutes with a great economy of acid would *then* become a subject of genuine marvel.

MACHINE ETCHER.

A REPLY FROM MR. WM. GAMBLE.

The letter of "Machine Etcher" seems at first sight to be inspired by some interested vendor of a rival etching-machine with the view of prejudicing the trade against the Levy acid blast. It would have been more convincing as an honest expression of opinion if the writer had appended his name. The report concerning the alleged deaths from acid fumes in Chicago originates from a trade journal which for some time past has sought every possible occasion to damage the reputation of the Levy machine, either through some personal feeling against Messrs. Levy, or, it may be assumed, because the editor has been encouraged by the trade union, or a certain section of it, to denounce the machine. It is a singular circumstance that this alarmist report has not appeared in any other American trade journal I have seen, not even in the official organ of the Photo-Engravers' Union. As a matter of fact no Chicago newspaper is using the Levy acid blast, the monopoly of the use of these machines in Chicago having been acquired by a trade photo-engraving house, the Jahn & Ollier Company. There is therefore no ground for your correspondent's inference that the acid blast machine is referred to. It is not even stated that the machines, whatever make they are, have caused the deaths, but only that the men had been working in a room where machines are operated. It is more than likely that if the deaths have occurred it has been through a burst carboy or carelessly spilled acid. There are well-authenticated cases of deaths from this cause.

However, it is perhaps more to the point to deal with your correspondent's theories, which seem to be based on a very slight acquaintance with the Levy acid blast. He has overlooked the fact that when the blower is working there is a constant suction through every crevice into which air can enter the machine—as can be proved by holding a lighted taper at the sides of the plate-holder when it is over the etching chamber. Now it is obvious that so long as there is suction of air inwards there can be no escape of acid fumes outwards, and the greater the pressure the greater the suction. There is, however, I admit, one condition under which fumes will escape from the machine, and that is where the operator so far disregards the instructions as to shut the gate valve and so close the exhaust pipe through which the fumes escape to the open air. Your correspondent evidently does not understand the working of this valve, for he says there is "no checking device to prevent the working valve being opened beyond a healthy pressure." The fact is, that the more the valve is opened the less the pressure. It is when the operator closes the valve so as to get above the normally required pressure that all outlet for the fumes is stopped, and they then come out from under the plate-holder, but certainly not in volumes, as your correspondent says. It seems that like most inventions the acid blast will have to be made "fool proof," by preventing the valve being entirely closed.

Again, I cannot understand your correspondent's reference to "globules of raw acid," for the acid is always diluted with a large proportion of water.

Let me assure your readers that the fears of your correspondent are quite groundless, and any inquiry made amongst users of the acid blast will elicit the universally expressed opinion that the conditions under which the etchers work where the acid blast is used are far more healthy than they have ever been under before. The fact that several firms have installed a second and even a third machine in succession is surely the best proof that the machine gives satisfaction and the etchers are most eager to work the machine. I do not hear any complaints of machines giving forth fumes, so that it may be safely concluded that no such trouble exists.

Business.

The Bartlett Engraving Company has just been established at Springfield, Mass.

Progress in Leeds. — Owing to the increasing demands upon their resources, Messrs. Gilchrist Brothers have lately rebuilt their premises, and are now specialising on high-class color-work.

Armitage & Ibbetson, Ltd.—An application for the compulsory winding-up of this business, made on May 25, was dismissed by Mr. Justice Swinfen Eady, in accordance with a resolution by a meeting of creditors in favor of voluntary winding-up.

Publications.

"Les Reproductions Photo-Mécaniques," by L. P. Clerc, price 5 francs (Paris: Octave Doin et Fils, 8 Place de l'Odéon).—A most useful volume of the *Encyclopédie Scientifique*, and one of which we would be glad to have a counterpart in the English language. All the monochrome processes of reproduction — including pure photography of the commercial type—are treated at good length, with a wide knowledge of the subject and a just appreciation of the needs of the beginner. The book is well up to date and complete, giving sufficient references to even the most recent improvements and introductions; and it is written in language that can be read fluently by those who have only a moderate knowledge of French, if they also know the principal technical terms.

"Lexikon für Photographie und Reproduktionstechnik," by Professor E. H. Emmerich, in two parts, bound paper, price 5 marks each (Vienna and Leipzig: A. Hartlebens Verlag). — Preceded by a series of folded plates of diagrammatic character, the principal matter of these volumes is arranged in alphabetical order, and illustrated freely with cuts amongst the text. The valued qualities in such a book are (*a*) accuracy, (*b*) completeness of survey, (*c*) proportion in treatment. On the first point the name of Dr. Emmerich is sufficient. The second (so far as we have been able to test and examine the work) appears to have had full attention, and it is only on the third point that we can found any adverse criticism. The purview seems to be altogether too German for a book which in many respects can be considered as universal in its appeal. For instance, take the men whose portraits are given. Daguerre and Niepce have full-page blocks, but when we come to the folder with a collection of leaders in modern photography we find R. Dührkoop, J. M. Eder, J. Gaedicke, Th. and O. Hofmeister, A. v. Hübl, A. Korn, H. Kühn, A. Lichtwark, Aug. and L. Lumière, A. Meydenbauer, A. Miethe, G. Pizzighelli, K. W. v. Röntgen, K. Schaum, and E. Valenta. In such a list we should have expected to see Abney, Stieglitz, Ives, and Demachy, to name only four men who surely have done much in modern times. So much for adverse criticism. For the rest, we can commend the book very highly.

Specimens and so forth.

A VERY HANDSOME JOB of fifty beautiful three color plates by Gilchrist Bros., of Leeds, is a book just published by Ben Johnson & Co. of York—*The Flowers and Legends of Oberammergau.* The matter is by Miss Edith Milner of York, sister of Sir Frederick Milner, and the water-color originals of the flower pictures are by Miss Lucia Lang, a native of Oberammergau, belonging to the same family as Anton Lang.

CHANTECLAIR (no connection with a play of a similar name) is a fortnightly magazine, published in the interests of a raw-beef-juice factory in Roumainville. From the "process" point of view it is admirable; well illustrated with unusually good half-tone work, and with two three-color jobs—a decoration of the title and a full-page centre picture, worked in each issue. We compliment the printer, A. Jehlen, 24 Ave de St. Ouen, Paris; the block-maker, whose name we don't know, and the proprietors, Carnine Lefrancq.

BICYCLES WITH BACKGROUNDS make much better catalogue illustrations than the same machines without settings. This fact has been well realised and excellently acted upon by the Carlton Studio, which has illustrated a whole catalogue of machines with drawings of the bicycles themselves backed up with scenes of historic interest or natural beauty or incidents in the cyclist's life. We see the riders passing Hyde Park Corner or the National Gallery, gazing at Stonehenge, watching "the pass" on Rotten Row, paced by a motor-car, or riding in the rain, and we feel at once that a real interest has been added, without detracting in the least from the sale-power of the illustration.

NEWSPAPER HALF-TONES in one, two, and three colors are the special line of E. Hulton & Co., Ltd., whose equipment is designed for big turn-out in short time. An achievement of which they may well be proud is described in another paragraph, "Manchester Enterprise." Beginning process work originally for the supply of their own publications, they developed the service until now they contract and cater for newspapers almost from John o' Groat's to Land's End. In their own establishment they have a large general printing business; nine illustrated newspapers, including *The Daily Sketch*, *The Daily Dispatch*, and *The Sunday Chronicle*, and a great number of magazines, novelettes, etc.

The half-tone work varies from very fine book-illustration to bold, open-grain "sketchlight" news blocks for rapid rotary printing.

"ABOUT MEZZOGRAVURES" is the title of an attractive little booklet giving some interesting historical and other information for the general public, but (naturally) little that is of use to the technical man. It is issued by the Mezzogravure Company, 167 William Street, New York, on whose work we have quoted lengthy comments in more than one recent issue. It was accompanied by a number of mezzogravure specimens which include very fine examples indeed of machine-printed photogravures. There are also some that are distinctly poor,—not through any fault in the reproduction, but because the originals were bad or unsuitable. While the poor specimens are as interesting to us and to technical people as the best, it seems well to point out that in the selection of samples for the public every effort should be made to choose work that is good all through. If a customer sends a job that is bad in design, or poor in the original photography, it must be worked, of course, making the best of it, but it should not be used in specimening. Judging by results only, without a knowledge of the process, an outsider who saw only the best of the mezzogravure specimens would rate the work very highly, while one who saw only the worst would rate it pretty low. As a matter of fact, the work is extremely good, and worthy of good representation.

As regards the method, the Company's booklet says:—

"Many details of the process, which were attained after years of effort, are secret, but this much may be said:

"The subject is photographically reproduced on the copper plate, which is placed in chemicals and etched until—like the photogravure — the cavities correspond with the depth and variety of color in the original. The finished plate is cleaned and placed in a specially constructed machine which does just what the photogravure printer does with his plate, only more accurately and much more expeditiously. The plate is automatically flooded with ink, which is forced into the hollows. Next it is wiped until the surface is bright and shining, but the etching stands out in black, strikingly like the gold ornaments of the Florentine goldsmiths inlaid with black enamel. The paper is mechanically laid on and the whole subjected to tremendous pressure, which forces every particle of ink from the deepest recesses on to the paper.

"The resulting mezzogravure is the highest achievement in the art of mechanical reproduction. It possesses the depth of color of the mezzotint, the detail of the steel engraving, the softness of the photogravure, and resembles the half-tone in being practical in a commercial way."

Brevities.

"Prices are better to-day than they have been for some time" in the engraving and the electrotyping world, according to *The Plate-Maker's Criterion.*

Stereoscopy in the catalogue has been adopted by Herr Goebel, of Darmstadt, who uses it to illustrate his machinery, which is represented in England by Hunters, Ltd.

Polychrome postage-stamps are recommended by a French expert as likely to decrease the amount of stamp forgery, from which the French post office department has suffered considerably.

Instruction in process work and photo-lithography is provided at the Working Men's College, Melbourne, under Mr. James Aebi, editor of *The Camera House Beacon.* Students may attend any afternoon or evening.

Zincology is the name of a booklet issued by the Ault & Wiborg Co., of Cincinnati, New York, London, etc., to announce their entry into the business of manufacturing and supplying zinc plates, ready grained, for lithography or planography.

Lino-cuts, which were first publicly described in our own pages, are the subject of a patent by Michael Sandmann of Dresden, who claims "a process for the production of a plate for printing purposes consisting of a thin celluloid plate integrally mounted upon a linoleum base, comprising the process of first making smooth the linoleum base, then pressing the celluloid plate, the surface of which is moistened with a liquid solution of camphor in alcohol, on the linoleum base."

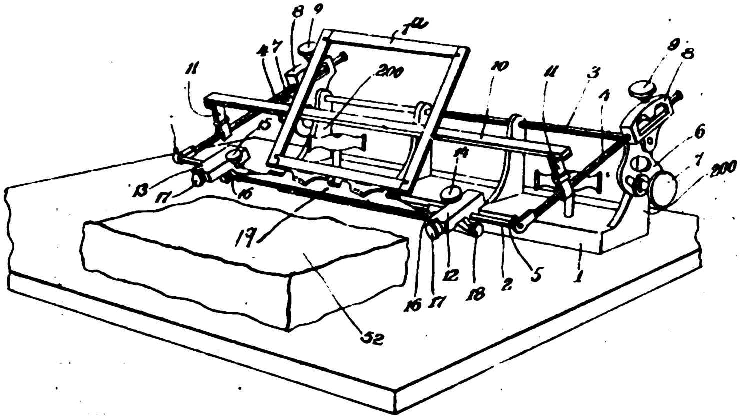
The kinetograph as a salesman was first adopted, we believe, by the makers of agricultural machinery, who could thus explain the operations to farmers in the great American West, who could not well come to the cities to examine for themselves. It is reported that this same method has been adopted by one of the American printing-machinery firms, which not only shows complete machines in operation, but also important details of gears, ducts, etc. Truly a wonderful development of illustration.

An Educational "Outing."—The employés of Messrs. Gilchrist Brothers, Leeds, paid a most enjoyable visit to the Printing Exhibition on June 4th. Leaving Leeds by midnight on Friday, they arrived in London at 6 A.M. After an excellent breakfast at the Midland Railway Hotel, they set themselves the task of seeing as much as possible of London before dinner. The whole of the afternoon was devoted to the Printing Exhibition, and a visit to the Japanese Exhibition in the evening brought to a finish a most enjoyable day.

Penalised Magazines.—It is an anomaly that a magazine published once in seven days can be and has been sent through the British post office at the rate of a halfpenny for eleven pounds weight, while a similar magazine if published once in ten days, or fortnightly, or monthly, has to pay threepence for the conveyance of eleven ounces weight. This is because one can be "registered as a newspaper" while the other cannot. The discrimination means a great deal to blockmakers, for the growth of all kinds of technical and class journals is checked by the cost of distribution, and the removal of this discrimination or the granting of better terms would lead to greatly increased use of illustration.

A Record in Newcastle.—The outing of the Newcastle Typographia to the works of the Richardson Printing Ink Company, at Gateshead, provided a "record" in blockmaking. On reaching the works at 3.20 p.m. the guests were photographed by Philipson, Son & Skilleter, and when they reached the machine-room they found a block of the group running on the machines and were presented with copies. The block was on the machine and printing at 4.55, although the works of Philipson, Son & Skilleter are two miles from the ink-works. One hour and thirty-five minutes from exposure of the plate to the printing of the block—with two journeys of a couple of miles each—is quite bustling work, and well worth recording with approval and congratulation.

Transfer Tints.—These, which have been so largely improved and pushed by Mr. Benjamin Day that their technical name in America is "Ben-Days," or "Ben Day films," are the subjects of yet another patent (2722 of 1910) claimed by Benjamin Day, of Summit, N.J., U.S.A. It refers to the apparatus, in the form of a special frame, used for transferring from the stock tints to a litho stone or a plate. The details of construction will not interest our readers, but the illustration, from the specification, will give a sufficiently good general idea of the apparatus.



The new process dry plates placed on the market by Hughes & Kimber, and manufactured by the Paget Prize Plate Company, are worth the attention of all process men. They have not been offered hastily or without full investigation, for they are the results of a long series of experiments by Mr. Kimber, the Paget Plate Company, and a veteran process worker, a combination that ought to produce a good article, and undoubtedly has done so. Our own tests show that the "ordinary" process plate is quite equal in all good points to the best on the market. The old difficulty of finding a rapid plate that would give clean, sharp dots in half-tone appears to have been overcome to a remarkable extent, for the negatives leave nothing to be desired, yet the plate is rapid—more sensitive, in fact, than seems necessary in the modern studio, with powerful enclosed-arc lighting. Excess rapidity is never a fault, with careful working, and in some cases it is an enormous advantage.

The panchromatic process plate, sensitised by bathing, apparently in pinacyanol, has the deficiency of sensitiveness in the green that is characteristic of pinacyanol, and therefore indicates the use of a green safelight. It is rapid, works well and cleanly, gives excellent sharp dot, and has a good range of color-sensitiveness except as above mentioned.

Royal Funeral Records.—The King's death and the great events following upon it involved immense demands upon the trade engravers. A side-light upon what happened in the studio is supplied in the little 16pp. 8vo publication called *Chippings*, which was given away at the stand of Messrs. Carl Hentschel, Ltd., at the Printing Trades Exhibition. Incidentally *Chippings* revealed that the largest half-tone upon record, 7 feet in length, was made by the firm to reproduce the funeral procession in panorama, and was executed between 11 p.m. and 8 a.m., as a slight extra to an already full day's work. This was for one journal; and for another, four blocks measuring 16 feet in length were produced, and (in the way of miscellany) two hundred and ninety half-tone blocks, mostly with designed borders, all made practically within twenty-four hours. For a third, four very large blocks reproducing a pencil drawing of Edward VII. made after death were engraved between 3 a.m. and 9 a.m. This was wholly outside of special pages devoted to illustration in great journals like the *Daily Telegraph*, which entrusted the firm with this exceptional and necessarily "rushed work." Hentschels are proud of an acknowledgment by the editor of one of our best illustrateds, whose appreciation of the spirit in which a difficult situation was faced prompted him to write: "Allow me to thank you and congratulate you on the splendid way you and all your staff have carried out the rush of blocks in connection with the King's death. It has been admirable and most helpful."

Manchester Enterprise.—On the day of the Royal funeral, as many ordinary trains were stopped, it was necessary for Messrs. E. Hulton & Co., Ltd. to make special arrangements for the supply of the work of their photographers to their various newspapers. They made two fine records:—Windsor to Manchester in 3 hours 35 minutes; and a big supply of half-tones finished in two hours from the arrival of the train. To do this a special train left Euston 2 p.m. with the London photographers. Two motor-cars left Windsor, with the men who had been photographing there, at 1.50. The train made only one stop, at Berkhampstead, to pick up the Windsor photographers, and reached Manchester at 5.25 p.m. All negatives and prints were finished in the train. Of the two motor-cars from Windsor, only one was actually occupied by photographers, the other being taken simply as insurance, in case of possible break-down.

At 7.30, less than two hours after the prints reached the office, duplicate sets of blocks were ready for sixteen pages of *The Daily Sketch*, three pages of *The Daily Dispatch*, a very large number for the firm's weekly publications, and a still greater number for outside clients with whom contracts for blocks had been made in advance.

By breakfast-time next morning, copies of *The Daily Sketch* were distributed all over England, and even through the principal cities of Ireland and of Scotland. To do this it was necessary to run special trains to Liverpool, Wolverhampton, Birmingham, and Nottingham; to Leeds (connecting for Newcastle and the North), and to Crewe, to connect for many south-country places.

The sales were phenomenal. In spite of greatly increased original orders, many places required big additions. One agent in Dublin ordered 15,000 additional copies by wire. Glasgow had a second supply by 11.5 train on Saturday morning, and additional quantities later. Newcastle-on-Tyne had three extra deliveries on Saturday, but ended by being "sold out everywhere." A special train was run to Crewe on Saturday afternoon to catch various connections, and the Liverpool demands for the army of news-boys continued until Saturday night.

The Daily Dispatch, too, in spite of printing thrice its enormous normal issue, had to go to press again before Saturday noon.

And all this was due to half-tone pictures.

THE TURIN EXHIBITION 1911.—The various forms and booklets of information have just been issued by the Board of Trade, which has undertaken to help British exhibitors as far as possible. Inquiries should be addressed to The Director of the Exhibitions Branch, 30 Broadway, Westminster, S.W. Process work will be exhibited in Class 18 of Group 3, Photography and its applications; and in Class 149, Engraving and Process Blocks, of Group 23, Newspapers and the Art of Printing.

Class 18 is divided into—

Photo-types, picture post cards, pictures, albums and prints of every description produced by photographic processes.

Photo-printing, prints obtained by process work in relief, hatched and mezzotint blocks.

Photo-lithography, various applications of photography to lithographic printing by direct and transfer methods.

Topographical and geographical maps obtained by means of photographic processes.

Combinations of photo-lithography combined with photo-transferring.

Process work of every description.

Three-color and four-color processes, three-color prints obtained by means of typography, transferring, etc.

Prints obtained by four-color process and various other processes for producing color prints by means of color photographically reproduced.

Class 149 includes—Drawings in black or colors for various kinds of engraving. Wood engraving. Copper and steel engraving. Chemical engraving on zinc, copper, steel, brass. Process line engraving on various metals. Mezzotint blocks. Three-color and usual four-color blocks, four-color processes with fundamental colors, chromo-photography, auto-color process, etc. Auto-relief processes, photo-sculpture, illuminated relief work (aerographs). Engraving of plates for stamps and for relief printing. Photography applied to the graphic arts, and materials therefor. Printing by the chalcographic process: chalcography, heliotypes (phototypes), etc.

THE PENROSE VACUUM FRAME.—The latest time-saving introduction of Penrose & Co., Ltd., is proving very popular and quite a large number are already in use.

Fig. 1 shows the frame open, ready for putting in the negative and plate. A rim of bevelled indiarubber attached to the front glass surrounds the plate. When the back is laid upon it the rubber rim forms the sides of an air chamber. The back, which is of heavy oak, is covered by a planished steel plate, and this in turn is covered by felt. In the centre of the back is a hole communicating with the valve. When this back is laid in the appearance of the frame is as in fig. 2.

The air valve, which is made of brass, is of novel construction, yet extremely simple, and not likely to get out of order. It is surrounded by a ring of indiarubber, outside of which is a wooden ring, forming a recess and seating for the air pump. A little lever is pushed on one side to allow the plug of the valve to rise and permit the air to escape from the frame when sucked out by the pump, which is placed as shown in fig. 3.

Two or three turns of the handle are sufficient to exhaust the air, and it is soon seen that the vacuum has been established by the handle of the pump tending to fly back. Then the pump is lifted, the lever of the valve pushed back to prevent the plug from rising. The frame can then be safely turned over and handled even roughly without any chance of the back being released. On looking at the front it will be seen that the rubber rim is crushed down by the enormous pressure, and the contact between the negative and plate is absolutely sure and uniform. There is no risk of breaking the front glass so long as the negatives and plates are in, but if any attempt is made to try the vacuum without the negative and plate in it the glass will probably be broken by enormous pressure on the central portion, which is unsupported by negative and plate. When it is desired to release the pressure all that is necessary is to push back the spring lever on the valve, and raise the plug by means of a small knob. The air immediately leaks in and the back rises, freeing itself so that it can be easily lifted out.

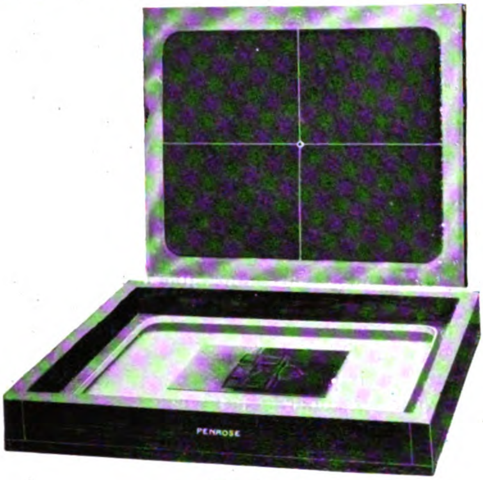


FIG. 1.

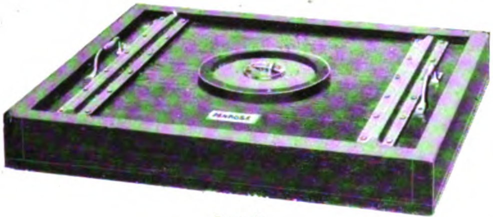


FIG. 2.

The makers issue a leaflet giving full description of the frame, with stock sizes and prices.

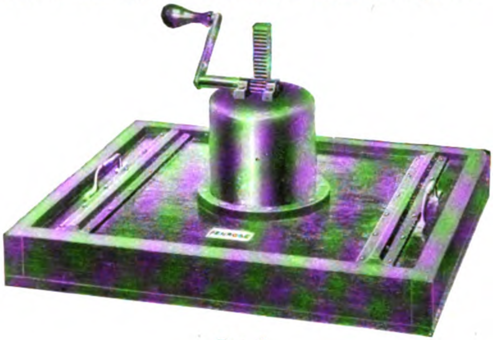


FIG. 3.

It is now made up to 30 × 24 inches, but will soon be obtainable up to 42 × 32 inches, and probably larger.

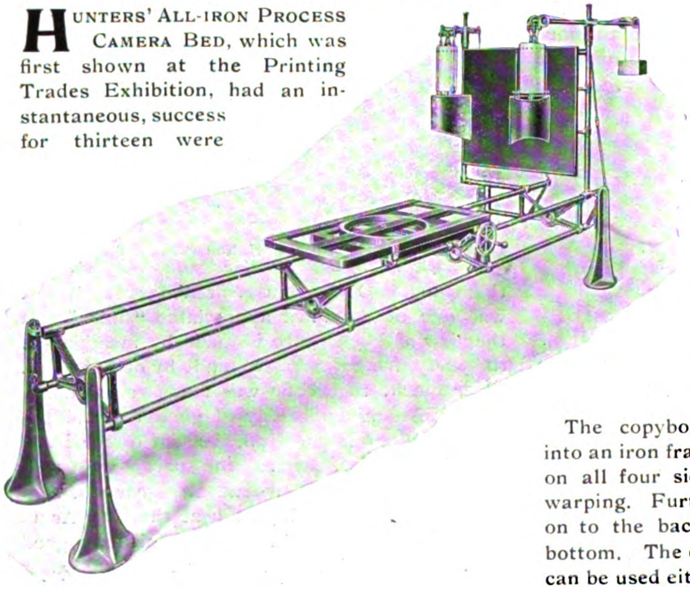
AN OUTING TO CHESTER, on May 28th, gave great pleasure to a party from the engraving side of E. Hulton & Co., Ltd., of Manchester. The morning was spent in viewing the antiques of the ancient city, and by some of the members in photographing what attracted them most. Derby House, off Watergate Street, was one of the most appreciated "finds," and the view of its entrance is made by members of the party, from a negative made by one of them. After lunch, the group was made—a memento of a most enjoyable day of good fellowship—then a drive to Eaton Hall, the seat of the Duke of Westminster, where the party was well received, and shown around the grounds, conservatories, etc. A high tea at the City Arms Hotel might be thought to have finished a good day, but not a bit of it. After tea there was a launch trip, and rowing on the Dee, and even

Some of the Engravers of Hulton & Co., Ltd., *Daily Sketch, Daily Dispatch, Sunday Chronicle*, etc.

Derby House, off Watergate Street, Chester.
One of the many snapshot views secured by the Hulton picnic party as a memento of their 1910 outing.

when the very late train for home was taken the spirits of the company were not exhausted, for the saloon carriage fairly rocked with merriment.

Hunters' All-iron Process Camera Bed, which was first shown at the Printing Trades Exhibition, had an instantaneous success for thirteen were sold during the progress of the show. This new bed has the great advantage over wood stands of being absolutely non-warping. Owing to its rigid construction it has been found possible to decrease the width, and it therefore occupies less floor space. The saddle and turntable are machine-planed, and can be locked at any desired point along the length of the stand.



The copyboard is bound in iron, fitting into a frame of angle iron with two flat iron stays across the back, this absolutely preventing any warping due to heat from the arc lamps. The iron frame to which the copyboard is attached is provided with two struts fitted with right- and left-handed threads, and further adjustable so that the copyboard can always be guaranteed to be perpendicular. The arc lamps are suspended from two uprights which form part of the camera stand and are adjustable in all directions with the greatest ease, thus doing away with either the overhead gear or the floor-cumbering tripod stands hitherto in use.

Another important feature is that the arc suspension standards form part of the stand itself, doing away altogether with expensive overhead gear or tripod stands, which latter have been somewhat objected to on account of the floor space they occupy. The standards supporting the arc lamps are adjustable so that the lamps can be swung nearer to or farther from the copy, in a circular direction. At the same time, they have a further adjustment, inasmuch as the iron rods on which the lamps hang can be pulled away from the copyboard or pushed nearer to the same.

Pulley wheels are provided on the upright standards over which the wires run, carrying the counter-balance weights of the lamps, so that three distinct movements of the lamps are provided for.

By means of a thumb-screw the lamps are immediately fixed in any desired position, and the guide pulleys prevent the chafing of the wire ropes by which the lamps are suspended.

The copyboard is mounted and fitted right into an iron frame which encloses the copyboard on all four sides, preventing any possibility of warping. Further, two iron bearers are screwed on to the back of the copyboard from top to bottom. The copyboard is adjustable so that it can be used either for lens or prism.

Estab. Jan. 1894.
"The Process
Photogram."

THE PROCESS
ENGRAVER'S
MONTHLY

THE PROCESS PHOTOGRAM
ESTABLISHED JAN 1894

Vol. XVII. No. 200.
AUGUST 1910.

Edited by H. SNOWDEN WARD, F.R.P.S., Founder of *The Photographic Monthly.*

IN THE HIGH COURT OF JUSTICE, CHANCERY DIVISION.

Before Mr. Justice Neville.

The Graphic Arts Co. *versus* Hunters, Ltd.

July 6th, 7th, 8th, 11th, and 12th, 1910.

Abridged from the shorthand notes of Messrs. Marten, Meredith & Co. and Messrs. G. Walpole & Co.

Counsel for the Plaintiffs.—Mr. A. J. Walter, K.C., and Mr. J. Hunter Gray (instructed by Messrs. Blundell, Gordon & Co.).

Counsel for the Defendants.—Mr. J. M. Astbury, K.C., and Mr. Robert Frost (instructed by Messrs. W. J. & E. H. Tremellen, agents for Messrs. Blair & Seddon, Manchester).

The Plaintiffs are an incorporated company in Philadelphia, Pa., U.S.A., controlling and operating the patents in a machine and process known as the Levy Acid Blast.

The Defendents are a limited company in London, England, controlling the sale of a machine made under the patents of Mr. Mark Smith of Manchester, and known as the Mark Smith etching machine.

The action is brought to restrain the defendants from making or selling the Mark Smith machine, which is alleged to be an infringement of the patents of the plaintiffs.

For the Graphic Arts Company Mr. Horatio Ballantyne was called as an expert and Messrs. E. W. Ashworth and A. E. Dent as trade witnesses. For the defence Professor Vernon Boys and Mr. James Swinburne appeared as experts, with Messrs. A. T. Clarke, J. A. Cottrell, W. Ewen, and F. W. Peters as trade witnesses.

When the case closed, on Tuesday, July 12, the judge reserved his decision, which had not been given when these pages went to press (July 20). [The issue will be kept open in the hope of including this important decision in the later pages.—Ed.]

First Day, July 6th, 1910.

Mr. A. J. Walker, K.C. (counsel for plaintiffs) opened the case and called—

Mr. Horatio Ballantyne, F.I.C., F C.S., who said that for a considerable time before this case arose he had been doing a great deal of work in connection with photo-engraving. He had made himself acquainted with the plaintiffs' specifications, and with those set out in the particulars of objections. He had conducted many experiments, which he would describe.

In photo-engraving the printing was done from the raised portion of the plate, of which the half-tone plate, prepared with a half-tone screen, was typical. (The method of preparing a half-tone plate from a photographic negative was then described.)

The method of tub-etching in vogue prior to the introduction of the acid-blast machine was described, the witness pointing out the necessity for steady rocking, an even flow of acid, and careful brushing to remove metallic impurities without disturbing the resist, which was extremely thin and brittle and liable to be splintered from the edges of the dots, causing the dots to be deformed by the acid. He could give many instances where slight deformation of the dots destroyed the plate.

The time of etching varied with the strength of the acid and the size of the mesh (screen), but twenty minutes was a fair time for the first etch. With tub-etching a great deal of retouching, stopping-out, and re-etching was necessary.

Under-cutting, the bane of the photo-engraver, was described and illustrated by photo-micrograms, showing the different results obtained by tub-etching and by the patent method.

The plaintiffs' specification claimed the etching of printing plates such as are used in photo-mechanical engraving, by forcibly spraying the mordant simultaneously and uniformly, both as regards quantity and force of impact, all over the surface of the plate, the plate being held face downward. In this way there was no under-cutting within the ordinary range of photo-etching. One could go much deeper without under-cutting than with tub-etching, and the etchings made by this process were normally much deeper. With the same strength of acid that required twenty minutes in the tub, two to three minutes would be sufficient in the patented process, and there would be no need for fine-etching. There was no need to brush the plate, and the etching showed clean cup-shaped depressions without under-cutting.

Compressed air was used as an atomiser; heat was generated by all etching operations; the compressed air would assist to cool the plate. Atomisers other than compressed air were known at about the time of the specification.

The witness then described the Mark Smith machine — an earthenware tank with a revolving paddle at one end, at the bottom; each blade of the paddle bent over to form a longitudinal scoop about a foot long, and the scoop perforated with holes, eight or nine to the inch, and something under a sixteenth of an inch in diameter. The scoops dipped into the liquid as the paddle was revolved, and projected it in a spray, tangentially from the ends of the paddles, against the face of the plate. The paddles revolved about two thousand times per minute.

The machine examined was at the premises of Messrs. Arthur Cox, and the witness had seen it in work at two other places. The plate was laid face downward in a carrier; there was a vent for fumes to escape, and a current of air was drawn in at the upper edges and around the spindle.

The etching fluid produced cup-shaped indentations precisely after the fashion of the Levy machine.

The witness had worked with the plaintiffs' apparatus also; in which the mechanical arrangements for reciprocating the plate and for removing fumes were slightly different from those shown in the specification, but the two were the same so far as etching was concerned.

The witness had considered all the earlier things disclosed in the particulars and objections, but the plaintiffs' invention was not in any of them. He had taken sand and emery,* but projecting them would not make a half-tone plate. They were useless for the purpose, because the resist must be one that was sensitive to light, and light-sensitive resists would not stand the abrasion of sand and emery.

Tub-etching had been going on since 1882. In Leigh's English patent 991 of 1886 (communicated by Truchelut, and combining the substance of his two patents) there was direction to mix sand and emery or the like with acid, to produce sand-blast effects upon substances not amenable to the dry sand-blast. "Moist" emery or sand was suggested, but the witness found that when only "moist" a mud was formed that could not be forced through the blower; and as more acid was added, before the stage at which it could be blown, the sand or emery separated out, giving a mixture of mud and liquid with which he could not get uniform effects. The mixture of acid and sand had no value in photo-mechanical work. If it could be projected it would have the same effect as sand-blast alone.

A German patent, No. 89,146 of 1886, was the same as Leigh's, but gave no drawings nor instructions how to work the process.

The second Truchelut patent said further experiments have shown that in certain cases the use of a mixture of liquid and finely powdered substances for etching purposes can be entirely dispensed with, but the purposes for which the invention was stated to be of value did not include half-tones. The witness had carried out the Truchelut method with an apparatus made as illustrated, and with the acid without any mixture of powder. He had tried it with one jet, as shown; with three and with six jets, and with the interposition of gauze, in an attempt to get even distribution of the acid over the plate; but neither with the simple Truchelut method nor with such modifications as he had been able to suggest, could a half-tone plate be made. There was some under-cutting, the resist was knocked off, especially in the axis of the jet. The witness showed several plates, including one made by spraying or spluttering the acid upon it, to show that marks were made which could not be removed. Truchelut did not specify the position of the plate [his diagram shows it vertical.—Ed.], but Leigh showed it as vertical.

Cross-examined by Mr. Astbury.—The witness said that photo-engraving had reached a high state of perfection before the introduction of the Levy patents. He did not know that for eight or nine years after the date of the patent no machine worked successfully for want of proper nozzles, nor did he know when the Levy machine was first worked in England. He had heard of it, but not seen it, prior to June 1909. The mordant; the resist and its thickness; the fact of printing from the surface and not the cavities; the depth dependent upon time, strength of mordant, and method of rocking; the delicacy of the resist; and the fact that if the etching ate through the resist it would spoil the printing surface, were all known before the date of Levy's patent.

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* See Truchelut's patent, *The Process Monthly*, July 1910, p. 158, which was in question at this point and later.

He had not heard of a process of putting the plate face downward over the acid and rocking it so that the liquid splashed up against the plate. If he were told that such a method had been used he would see no advantage in it. The action would be more rapid with face downward than with face upward, other things being equal. This was one of several claims by Levy, a real advantage, but it did not prevent the under-cutting. If the plate was face downward and the acid projected upon it by swilling about, the speed of etching would be increased, but the tendency to under-cutting would be as bad as with the plate face upward, because of the side-wash.

A skilful engraver could etch a plate without under-cutting even if it were face upward. Pitting of the printing surface of the plate was quite a common result with bath-etching. It varied in amount, but was often found under the microscope.

There were many shops where beautiful engravings were produced without a machine, but not in a single etch. Touching-up was needed. He had never seen any fine tub-etched work without retouching.

The Levy process gave a greater depth of etching, while still retaining the printing surface in its proper condition, than was possible with tub-etching; and in his view the Levy process necessitated the plate being face downward. The spray must hit the plate substantially at right angles. The impurities were gradually eaten around until they were loose and could be knocked off by the jet. The compressed air did tend to cool the plate, allowing the use of a stronger mordant than would be possible without such cooling. The liquid would fall from the surface in drops. The inventor seemed to think that the drop must be round at the top as well as at the bottom, and thus tend to etch a cup-shaped depression without under-cutting, but the witness thought this theory was wrong.

The resist would not be disturbed, whether the mordant was flowed or was in minute particles, if the proper resist and the proper force was used.

Coming to Brooman's specification, it contained various methods of forming a fine mist or spray which were well known at the time.

West's patent had to do with printing surfaces, "engraved by being held under an acid-container having a bottom all perforated with small holes, which allows the acid to fall in a fine shower, to the action of which the plate is subjected and thus etched to any desired depth." This was exposing the plate, in a bath, to a shower. It was provided that the image should be treated with asphalt and resin, and the back and edges of the plate coated with lac varnish. Witness thought this meant immersion, and not suspension of the plate above the liquid in the bath, or why should the back be varnished? He thought it was a foolish thing to attempt, and that was why it never went further. If a plate was held horizontally and corrosive stuff fell on its face, some might roll round to the back of it.

The back could be protected by varnishing around the edge; the etch would then drop off the edge, as the varnish was a greasy substance. He thought that West's intention was to put his plate in a bath and then to have an elaborate arrangement by which he could pour a shower of something on to something which would not be there.

Hancock's specification was for matting, not for etching, glass and other vitreous surfaces. He said, "I may apply it in the form of fine spray." His process was peculiar, as he used a resist that was intended to be attacked, and was mixed with metallic powder, so that as the resist was eaten away it was taken more rapidly at some points than at others.

In Sachs' specification a spray of sand was forced upward by compressed air, to chip off the resist and leave parts exposed to the etching.

In Mathewson (15,980 of 1884) a sand blast, driven by steam, throws sand against a plate held face downward; and in Breadner, liquid spray is thrown by means of a paddle wheel upon fabric passing vertically before it.

ADJOURNED TO THURSDAY, JULY 7TH.

Damaged Half-Tones and their Repair.

A lecture delivered to the Vienna Graphical Society by Ludwig Floimair.

Translated from "Graphische Revue Oesterreiche-Ungarn."

(*Continued from p.* 152.)

In the case of very bad damage, which is not of frequent occurrence, but when it does occur is generally very vexing, it is best to make a print, dismount the plate, cut out the print exactly to size of block, not forgetting to allow for the mounting-edge through which the pins are driven into the wood, and to fasten the print upon the back of the plate with the picture facing outwards. Place the plate-face upon a hard iron or stone bed, with paper between for protection, and beat out the injured part as seen on the print with a punch and hammer (or a blunt-pointed piece of steel) to raise it again to printing level.

This will generally be successful. In extremely bad cases, however, it will be necessary to effect a repair by soldering or inserting particular parts. For soldering, carefully clean the place to be treated, scrape it, and when it is quite bright, dab it with soldering liquor. Then heat the plate and hold some soldering-wire on to the spot until it melts. This will succeed at once if there is enough liquor (too much is injurious). If it has been successful, tap down any tin that may happen to rise with a hammer, to settle any blisters, and finally remove any remaining projections with the square-pointed graver. Fig. 8 shows the process and the course of the graver. As soon as the printing surface has been restored it is easy with the "tint" graver to re-form the screen or the lining.

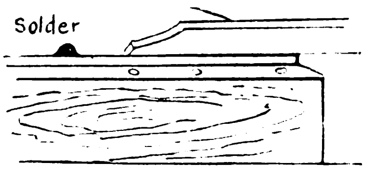


FIG. 8.

The soldering may be done variously with a soldering-iron, a blow-pipe, or a finely pointed thin stick of wood. For a long gash it is advisable to form a reservoir, as shown in fig. 9, from which the solder may be run into the scratch

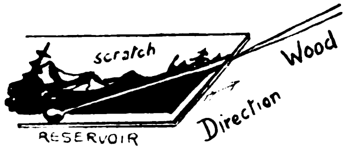


FIG. 9.

with the aid of the pointed stick after it has been dabbed with soldering liquor.

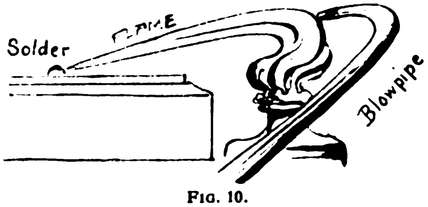


Fig. 10.

Obviously the plate must be quite uniformly heated to keep the solder always fluid. In using the blow-pipe (fig. 10) the flame, from a spirit lamp for preference, is blown upon the spot which has been prepared as before, but care should be taken to put no more than the requisite quantity of solder. Injuries to the ruled border line, to line-drawings, border ornaments, etc., may, where it is not absolutely necessary to solder, very often be repaired with the oval graver No. 53 or 54 by pressing the graver against the body of the plate and moving it to and fro, even turning it, until the zinc is raised above the printing level. Then it is smoothed down again as directed before (fig. 11). New lines can be made by pressure with the square graver against the line that is to be raised, but care must be taken to use a wooden rest to avoid scratching, and so doing more harm than good (fig. 12). This will form a ridge which has only to be depressed to make a line. By the side of this it will be easy to draw a white line with a graver or etching-needle (fig. 13). Of course the cases that I have cited are but a fraction of the possible manipulations.

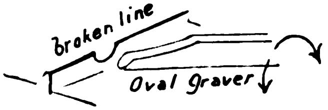


Fig. 11.—Putting the graver to the plate; the arrows indicate the movement.

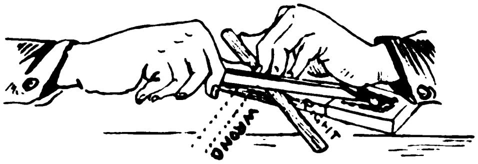


Fig. 12.—Position of the wooden rest under the oval or square graver in removing impurities in the lines, or dirt, in deepening, etc.

In this way one can generally help oneself without calling in the aid of the photo-engraver, which might, as a matter of fact, especially in the country, not always be a simple matter. There it is often imperative to be one's own saviour. It will be readily understood that it is not an easy thing to remedy really serious injury, nor do I wish to appear anxious to train up photo-engraving repairers. I purposed solely to give hints how injuries

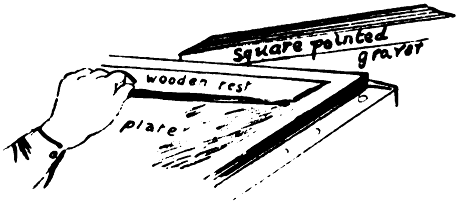


Fig. 13.

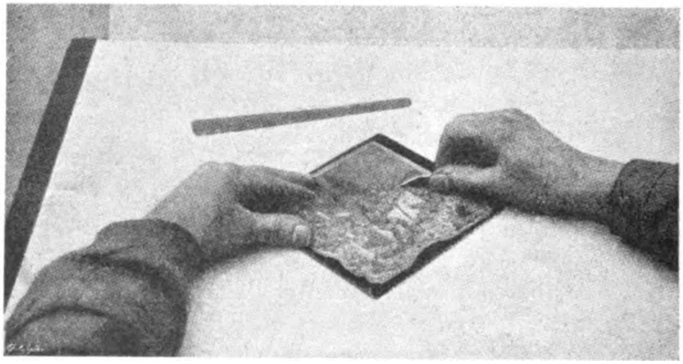


Fig. 14.

to the plates may be avoided, and, in cases where help is not readily procurable, how defects may be amended and repaired at home.

The usual position of the plate and of the graver is demonstrated in fig. 14. Figs. 15 and 16 display an injured plate and the same repaired, furnishing the proof of the working, as it were. It is not easy to describe technical-manual matter so that it becomes perfectly clear and intelligible; but I think that the accompanying diagrams will enable me to achieve this, which in the case of my lecture I attained by ocular demonstration.

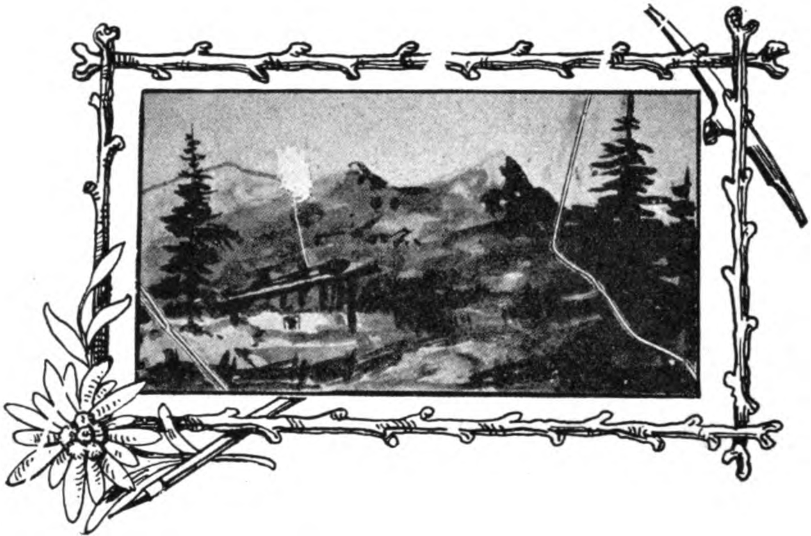


Fig. 15.—Damaged plate.

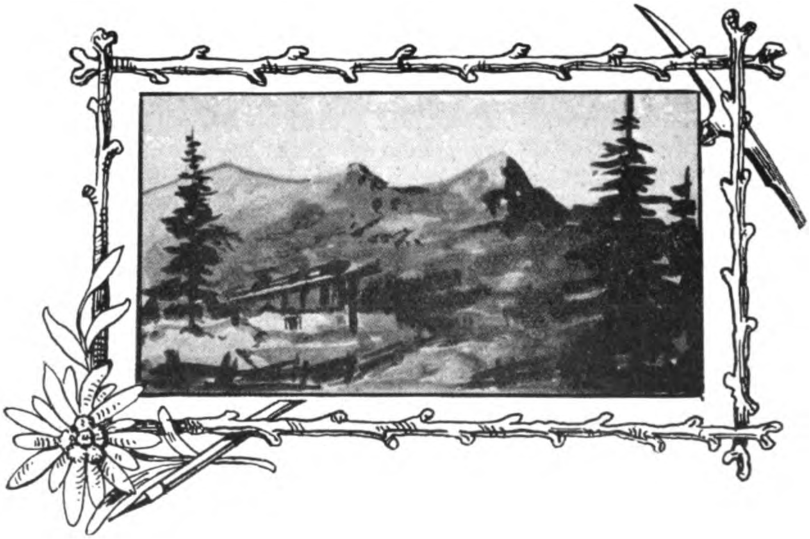


Fig. 16.—The same repaired.

In conclusion, let me refer to an instrument which is of considerable service to the plate-retoucher, and no less important in our case, viz. the roulette. This is a little steel wheel the edge of which is toothed to match the various sized ruled screens. It is fixed into a handle, and being passed over the plate reduces the dots and relatively enlarges the light intervals. One simply has to take the corresponding roulette and pass it over the parts to be repaired or lightened.

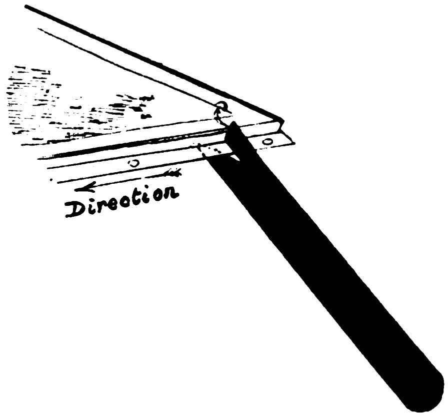


FIG. 17.

A few hints may be added which should prove useful. For vignetted plates which often print badly it may be sufficient to dismount and underlay with paper, hammering down the vanishing edge. But filing down the back of the plate towards the edge and repinning very tightly upon the wood-block will give surprising results. It will often happen that the border line of a plate prints badly or comes stronger than the rest; especially in three- or four-color printing some colors will project beyond the others and spoil the effect. A very simple instrument (fig. 17) will provide a certain remedy. It is made of strong steel-plate and is passed along the edge from top to bottom of the dismounted plate, thereby removing any ridges as well as projecting edges.

About the printing from half-tone blocks I will say nothing. In that branch I am no specialist, only in their manufacture. But naturally as a specialist in photo-mechanical reproduction it is of supreme interest to me that they should be printed well. I believe I have made a contribution with these remarks in a direction which has not often been taken. To secure good printing there needs not alone good ink and good paper, a good printer, and first and foremost a good plate; but the last must not be impaired by even the least hurt, to which it is only too liable. And to prevent as well as to remedy these, I trust I have in this article given some useful hints.

THE MASTER PRINTERS' PRESIDENT, just elected at the annual meeting of the Master Printers' and Allied Trades' Association, is not only a printer and publisher, but also one of the most enterprising of photo-engravers—R. H. H. Baird, J.P., of Belfast. He is the senior managing director of W. & G. Baird, Ltd., of Belfast, printers, photo-engravers, and bookbinders, and publishers of the *Belfast Evening Telegraph* and many other newspapers. Mr. Baird is a son of the late Mr. Wm. S. Baird, J.P., one of the founders of the firm. He was born in 1855, and upon leaving school in 1869 he entered his father's business, embarking upon a strenuous and remarkably successful career.

Since the death of his father in 1886 he has had the sole management of the firm, and every year has witnessed progress in all directions. He is at present chairman of the Ulster District of the Institute of Journalists.

Mr. Baird is prominently identified with the public life of Belfast. He is a Prince Mason, P.P.S.G.W., of Antrim, and a member of the Church of Ireland. Socially he is a *persona grata* in the varied circles in which he moves, always possessed of the utmost bonhomie and a fund of genuine Irish humor.

("The Process Photogram.") August 1910

The Future of Photo-Engraving.

Address by S. H. Horgan, Editor, *Process Engraving*, in *The Inland Printer*, Chicago. Delivered before the International Association of Photo-Engravers, in convention at Buffalo, N.Y., June 27-28.

OUR art sprang from the discovery that light acted upon some substances in such a manner as to quickly change their composition, condition, or color. With this knowledge, and the fact that a lens would focus light rays, Niecephore Niepce worked until he engraved by the action of light the portrait of Cardinal d'Amboise, the first photo-engraving. This was in 1826.

In 1839 Daguerre gave to the world his discovery of a means for fixing the image obtained by a lens on a metallic mirror, which discovery was born of an attempt to engrave metal plates. So you see that our business preceded photography, the latter being a sort of by-product of the experiments of the first photo-engravers.

It was in 1839 also that Mungo Ponton discovered that the action of light caused bichromated gelatine to become insoluble in water — the principle on which all process work is based.

Since that time innumerable inventors, many of whom are present at this convention, have, by study, experiment, and the expenditure of much money, devised the numerous lines embraced in the term "process work." These men have brought about the great industry in which we are all engaged—an industry whose product enters into every household; which has been one of the principal factors in the spread of intelligence and of civilisation; which has been the means of advertising all lines of business and making the fortunes—of others. Is it not time that we awakened to the propriety of keeping some of the rewards of our business for ourselves?

FORTUNES, FOR OTHERS, IN PROCESS WORK.

No statistics will be inflicted on you. For it has been said — There are three kinds of liars: the ordinary everyday liar, the accomplished liar, and the statistician. Everyone knows that with the increase of illustrations all literature has been so popularised, from the daily newspaper to the *édition de luxe* of a book, as to have brought immense fortunes to publishers, while the process man contributes his time, talents, industry and fortune itself, to become a further slave to the power that is getting richer at his expense. It would take hours to tell how some of these great capitalists have profited by photo-engraving. A couple of examples will suffice.

In 1883 Mr. Joseph Pulitzer got control of *The New York World*, and struggled along with it until the 12th of March 1884, when he startled newspaper publishers everywhere by producing on that Sunday a page of type illuminated with crude single-column cuts. The result was almost instantaneous. The edition was speedily sold out, and from that day Mr. Pulitzer's fortune was assured. From a man overwhelmed with debts on the day he began to use cuts, it is now said that his income is one and a half millions a year. He published a chart later to show the rapid growth in the circulation of *The World*, and the line of increase shot upward from that March 12. His success with cuts taught all other papers that if they wished to fill a popular demand and increase their circulations they must use our work.

Another New York exhibit is that of

the magazine proprietor who began by having trouble in getting photo-engravers to extend him credit for the illustrations he needed, who is now so rich that he has purchased papers in several cities and expects to have a chain of them at an expenditure of possibly $100,000,000.

PHOTO-ENGRAVERS PLAYED ONE AGAINST THE OTHER.

It might be asked: Why is it that these great book, magazine and periodical publishers do not instal their own engraving plants? Before process-engraving came into use they employed their own engravers; why the change? Because they have found that owing to the unbusiness-like rivalry which actuates photo-engravers they can play one engraving firm against the other, as they cannot do in paper-buying, electrotyping, or press work. Thus do they get their engraving done cheaper than they could do it themselves, and, paradoxical as it may seem, frequently cheaper than the process engraver can do it.

If we had time to review the progress of process work we would find that it has in the past not only filled the actual wants of the publishers, who have made fortunes on it, but it is our brains that have interpreted needs which created demands, thus inaugurating many new lines of business. We would find that it has kept years in advance of the press builder, ink maker and paper trust, who have also fattened on it.

One illustration of this you will recall on the introduction of half-tone blocks. Those blocks required much more ink and a better distribution of it, as well as far more pressure, than line engraving, and still the press builders neither supplied the greater ink distribution nor would they build presses structurally better capable of standing the greater strain. It was not until 1889, after most of us had broken our Washington presses, that I had a press of that type built with all its parts reinforced to stand the strain of proofing half-tones the size of a newspaper page, and this press became the model for the present giant presses.

PROCESS MEN AHEAD OF THEIR TIME.

Think for a moment of all the trouble our own Ives had in getting a few of his inventions adopted. In 1891 he had devised the three-color block method but could not get an audience for it. Ten years later William Kurtz began to sink his private fortune in an attempt to popularise it, and failed, owing to the lack of intelligent support from either the ink maker or press builder. You gentlemen have all had your discouragements at seeing your work ruined by unsympathetic printers and publishers.

It was of a photo-engraver this story was originally told:—That after death, and while his guardian angel was escorting him upward toward the pearly gates, they met a prominent publisher going down. The habit of running after the customers was still strong in the process man, so he begged the angel to permit him to follow. Which they did. And when he reached the inferno, he saw a cage marked "Magazine Publisher" in which were many of his old patrons crying out for "more cuts, more cuts, at any price." Then he turned to his guide and said—"Please allow me to remain here, good angel; this is heaven enough for me."

Now, what of the future? What has it in store for us? Ours has been a constantly changing business in its short history. It will continue to be so. It is as difficult to prognosticate as Buffalo weather. Still we may predict something from "past performances," as we used to do before Governor Hughes came in.

WHAT OF THE FUTURE?

It would appear as if the engraving plants in the large cities would continue to grow in size, with consolidation among smaller plants. The tendency in other lines of business is in that direction. Why not in ours? Unfortunately we will have forces to work at night, in the rush seasons, so that sometimes the work will be carried on continuously, thus saving rent, space, and the cost of the extra plant for the same output.

The smaller plants, crowded out in the fierce competition, will either migrate to the cities of the second or third classes, or, if they remain in the large cities, will succeed only by specialising as the other professions are doing. This is the proper course. For the firm will be most successful in color blockmaking that has its photographers, etchers, finishers, and proofers trained only to that work. And it is in color blockmaking and printing that the greatest strides are to be made. Some firms will not do rush work, but recommend their customers to the firm that makes a specialty of it, while the latter will not undertake fine engraving but reciprocate by turning the work over to one that will give time to it.

There will be firms who will specialise in engraving on brass and steel and in making embossing dies; those who will do photo-lithography and supply the transfers for the offset press. Others will give their whole attention to photogravure and the engraving of copper rolls for rotary photogravure printing.

There should be specialists in coarse half-tone for posters and in grained plates; specialists in booklets and in catalogues, in calendars and in the high-light process, just as there are now in steel engraving and collotype.

THE MODEL PLANT.

But it is in the model plant of the future that the greatest improvements will come. We will recognise more thoroughly that our business is at present dependent on several most unreliable factors — light, heat, moisture, impure water and air; that we are troubled with variable chemicals and our great enemy is dust, not to mention dirt. To save much wasted time and money we must, in the future, carry on our work under uniform conditions.

The perfectly reliable light for our purposes has not arrived. It may be an electric light, though that is not certain. The positive methods for supplying pure and clean air, heat, moisture and dryness are here in such a way that we have merely to apply them. The unreliability of our chemicals is bound to increase as competition does. It will be one of the purposes of this Association to encourage the honest chemist—when found. What your Association can do was shown when you obtained from our Government the concession of a special denatured alcohol.

DUST-PROOF WORKROOMS.

As to dust, which spoils so much work, at a great loss of time and money in "make-overs," that can be eliminated now. It will be considered a necessary evil as long as we depend on open windows for ventilation, but there are factories and stores whose windows are hermetically sealed and into which no dust can possibly penetrate unless carried in on the clothes of workmen or customers. It is a simple matter to have all the fresh air required in a factory to be either forced through water and be washed perfectly clean from dust, or drawn through partitions of fabric that will filter the dust from it. I have been in establishments where the temperature was maintained the same on the 4th of July that it was on St. Patrick's Day, and the latter is often associated with the most uncertain weather.

We can have a pure water supply if we plan for it, while the equable temperature and purified air will bring our work into the class of healthful occupations.

Machinery will enter further into our business, performing operations in a more automatic, systematic, and satisfactory way, avoiding guess-work and the uncertainties that are now the cause of so much waste of profits.

We have scales for calculating the reduction and enlargement of copy, for the surface measurement of finished work, and tables for calculating charges. Systems for regulating the size of diaphragm and screen distance to the camera extension or enlargement or reduction of copy are ours, but how few apply them! Meters for testing the strength and quality of light we use are to be had. As machinery comes more into our work and cleanliness is found to be profitable, all exposed driving belts will be excluded. The proof press will at last succumb to the inevitable, and be operated by power with all the gentleness of touch which now characterises the hand proof.

Dragon's blood and other etching powders that irritate the lungs should not be allowed to destroy the air any more than sewer gas or noxious fumes. They should be confined or eliminated entirely. Dry plates will come more and more into use; and after the introduction of Paynetype, collodion and the silver bath will be banished entirely from our workrooms, without regrets. Instead of using pure metal to engrave upon it is possible the future metal may be an alloy possessing greater hardness than the present metals. Etching machines are sure to come into general use.

(*To be continued.*)

The Bassist Process: A Marvellous Claim.

In patent No. 957,596, May 10, 1910, just issued by the United States Patent Office, Mr. Ellis Bassist, of New York, makes what seems to us to be a surprising series of claims. The patents that we abstract from time to time are often of a surprising character, and sometimes the novelty is very far from obvious, but we usually print them without comment. In the present case, however, it seems well to direct our readers' special attention to the claims, and to the fact that such a patent is accepted by the United States Patent Office. This office shares with that of Germany a world-wide reputation for the keenness of its search into the novelty of the claims that come before it, and the issue of a German or American patent has been held to be strong evidence of the "patentability" of an invention, which of course is quite apart from its practicability or its commercial value.

With every wish to discover the novelty in this present method, we have failed. We can only suppose that the patentee believes that the use of a transparency on paper, in place of one on glass, is novel in its application to photo-mechanical work.

The patent reads:—

"My invention relates to a process for preparing, by photographic means, a metallic or stone surface for lithographic or typographic printing; and it has for its object to reproduce in quantity and in a simple and inexpensive manner, upon the same, an enlarged, or a reduced scale, pictures, engravings, drawings, sketches, and the like.

"In the accompanying drawings which illustrate my invention, fig. 1 represents a small sheet upon which the letter S has been printed or otherwise applied. Fig. 2 represents a negative made from the same, and reduced to the size shown. Fig. 3 represents a positive made from said negative, and enlarged to twice the size of the original print. Fig. 4 represents the plate for printing the copies after the said positive has been exposed thereon and the said plate washed. Fig. 5 is a similar view after etching and preparing the plate for printing. Fig. 6 represents a print made therefrom.

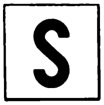


Fig. 1.

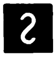


Fig. 2.

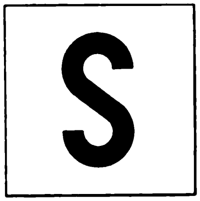


Fig. 3.

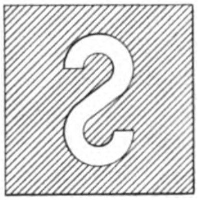


Fig. 4.

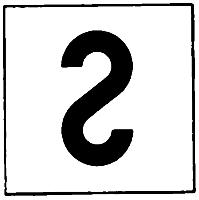


Fig. 5.

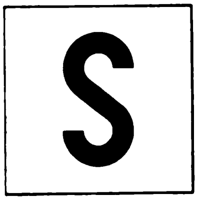


Fig. 6.

"In carrying out the process I first make from the original (fig. 1) a negative (fig. 2) in the usual manner and of any convenient size, the negative shown being reduced. From this negative a positive (fig. 3) is made, corresponding to the final size of the reproduction desired. This is preferably made upon paper such as the well-known solar print paper, or bromide paper, although any suitable material properly sensitised and which is or may be made transparent, may be employed. This positive if not sufficiently transparent may readily be made so by applying oil such as kerosene, gasolene, or fatty oils to the same. The positive, sufficiently transparent, is then placed face down upon a suitable sensitised printing plate (figs. 4 and 5) such as an aluminium, copper or zinc plate, or upon a stone, and exposed for the proper length of time. This plate has been previously coated with a sensitised glue mixture, and the action of the light is to so alter the portions exposed to the action of the light rays that these are not removed by a subsequent washing with water. The plate after the exposure is flowed over with water which removes the unexposed portions, the plate appearing as in fig. 4. If it be desired to prove the exposure, the plate may be flowed over with an anilin ink solution which is afterward removed by a weak solution of hydrochloric acid. After this, the plate is dried and inked with a fatty ink, the ink settling in the washed-out portions of the plate and adhering to said plate itself at such portions, while the portions affected by the light prevent the ink from reaching the plate and are covered with a film of ink. The plate is then placed in water and rubbed while in the water, whereby the said portions acted upon by the light are removed together with their adhering film of ink, leaving the plate marked only where the ink has reached the same and reproducing the original, but reversed (fig. 5). The plate is then etched and prepared in the manner usual in lithographic processes, and the copies (fig. 6) printed therefrom. In this manner any desired number of copies as well as of any desired size may be readily and inexpensively obtained. The process is especially valuable for making reproductions of considerable size, as the negative is not required to be large; and the positive, which is necessarily of the size of the reproduction, can be made upon sensitised paper which may be readily obtained in large sizes, impossible or prohibitive if of glass.

"I claim:—

"1. The method of producing printed matter in any size from an original, consisting in photographically producing a photographic negative on a suitable material from the original, then photographically producing from the said photographic negative an enlarged photographic print; then superimposing the said photographic print on the sensitised face of a printing plate and subjecting the same to the action of light, then completing the plate to form a printing surface of the subject matter of the reproduced original; and finally printing from this plate.

"2. The method of producing printed matter in any size from an original, consisting in photographically producing a photographic negative on a suitable material from the original, then photographically producing from the said photographic negative an enlarged photographic print; then superimposing the said photographic print face down on the face of a printing plate and subjecting the same to the action of light; then washing the same plate with water to remove the portions not exposed to the light; inking said entire plate; removing the portions of the plate exposed to the action of the light together with the attached film of ink by rubbing under water; etching and preparing the plate in the usual manner; and finally printing from this plate.

"3. The method of producing printed matter in large form from a miniature original, consisting in photographically producing a miniature photographic negative on a suitable material from the miniature original, then photographically producing from the said miniature photographic negative an enlarged photographic print, then superimposing the said enlarged photographic print on the sensitised face of a printing plate and subjecting the same to the action of light, then successively fixing and etching the printing plate to form a printing surface of the subject matter of the said enlarged photographic print, and finally printing from this printing plate.

"4. The method of producing printed matter in large form from an original, consisting in photographically producing a photographic negative on a suitable material from the original, then photographically producing from the said photographic negative an enlarged photographic print, then superimposing the said enlarged photographic print on the sensitised face of a printing plate and subjecting the same to the action of light, then successively fixing and etching the printing plate to form a printing surface of the subject matter of the said enlarged photographic print, and finally printing from this plate."

("The Process Photogram.") August 1910

Direct-transfer Photo-lithography.

Hermann Schneider says that lithography in France is languishing through the imperfect knowledge of those photo-lithographic processes which would revive lithography and enable it to compete fully with letterpress methods, as it did in old times. He gives, therefore, in *Le Moniteur de la Photographie* a process of his own perfecting, for which he claims specially fine results, in delicacy of detail and preservation of gradation, by direct transfer.

The first requisite is a perfectly regular grain on the stone or plate, which after graining is scoured with weak nitric acid solution, dried quickly, and warmed. It is then flowed with a weak solution of gelatine, and dried in a chamber free from draught at 40° C. (105° Fahr.).

Now a solution of albumen, 20 cubic centimetres, saccharic acid, 10; water, 200, is applied to the first substratum of gelatine and dried.

Two other solutions are now prepared:

A. Chrysaniline, 2 grammes; zinc chloride, 50 grammes; water, 1000 cubic centimetres.

B. Bichromate of potash, 14 grammes; bichromate of ammonia, 30 grammes; water, 1000 cubic centimetres.

For use, A and B are mixed in equal parts, and the mixture is applied to the stone, which is then placed in a vertical position to drain and dry.

The exposure is made under a photographic negative. In good daylight of normal intensity, the exposure varies from ten to fifteen minutes. The insolated surface is blacked with a hard roller, inked with a specially prepared ink, for the manufacture of which the following ingredients are employed in suitable proportions: Venice turpentine and writing ink, mixed hot, to which is added a paste composed of bitumen, very finely powdered resin, and ox grease.

The image is developed by rubbing a sponge, saturated with water, very lightly over the stone. When the copy is quite distinct, gum and dry.

Next wash with water to remove the gum, and remove the ink with turpentine. Again wash, and treat with a weak solution of nitric acid to remove the sensitised coating. The stone is kept humid with salt water and again perfectly inked with the lithographic roller and treated for impression by the ordinary methods employed in lithography. Thus, it will be noted, the photographic transfer is made directly to the stone in this process, the sensitising coat being destroyed by application of nitric acid before the last inking. In the ordinary photographic processes on stone, the photographic image receives the final inking, whereas here this image is removed and the stone itself, scoured with acid, is inked to obtain the prints.

Jacob Manz, president of the Manz Engraving Company, Chicago, has been in the engraving business for fifty-five years, beginning as a journeyman wood-engraver soon after reaching Chicago in 1855. In 1865 he began as a wood-engraver on his own account, and since then has been at the head of the steadily growing concern. Ten years ago he amalgamated a printing-business into the engraving company, making its proprietor, Wm. C. Hollister, vice-president of the joint concern. Paul H. Manz has charge of the firm's correspondence, and Adolph W. Manz, another son of the president, is works manager of the reproduction branch.

Machine-printed Photogravure.

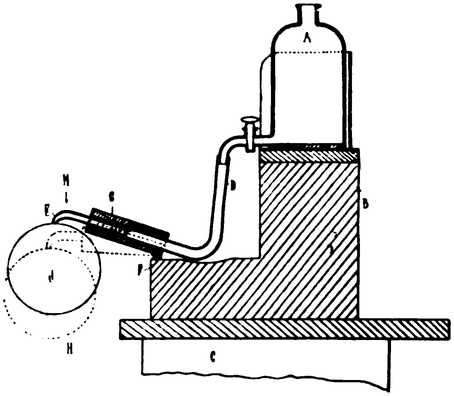
I. Merten's Roller Patent.

Recent issues have had much to say of the results of Dr. Merten's improvements in machine-printed photogravure as applied to newspaper printing, on common "news" paper and at great speeds. The patent for the preparation of the printing-rollers is of interest. No. 3194 of 1909, it sets forth, in the complete specification, that:—

"This invention relates to a method or process for preparing printing rolls for photo-engraving. It has long been known that patterns can be produced by photo-engraving upon rolls and can be printed off therefrom. The results were, however, somewhat uncertain and frequently unsatisfactory. The object of the present invention consists of an improvement in the method of coating the printing rolls or printing bands with varnish sensitive to light for the process requisite for photo-engraving. Accordingly, the novel process consists in causing the tube of a varnish distributor, placed under a definite pressure and having a suitable outlet, to oscillate only in a single plane, and moreover in one as vertical as possible, so that the aforesaid tube will constantly uniformly make contact at its outlet with the surface of the roll or of the band in spite of their oscillations.

"A constructional example of the carrying into practice of this invention is illustrated in the accompanying drawing.

"A bottle, A, is secured by the aid of a stand upon the slide-rest C of a lathe, and the pointed delivery tube E provided with an orifice, and connected by a rubber tube D with the bottle A, is firmly secured in a bed-plate G connected by hinges F with the stand B so that the point of the tube E can only oscillate in the vertical direction H H, and especially not sideways. The weight of the part G presses the outlet of the tube E firmly against the surface of the roll J and obliges this outlet to follow all the up-and-down motions of the surface of the roll, without permitting any displacement of this orifice in the direction of the roll axis.



"Instead of coating the printing rolls with a preparation sensitive to light in the above described manner by means of a vertically oscillating outlet orifice, one can also treat strips, such as an endless metal band, by stretching it fast over two or more rolls and causing it to move or slide beneath the outlet opening with the rotating rolls. In consequence of the greater surface to be coated, the part C will of course move more slowly, or the speed of the rotating rolls must be increased.

"Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

"1. Method for the production of photo-engraved printing rolls by coating or varnishing the same by means of a thin liquid jet and spiral delivery, characterised by the arrangement that the outlet tube of the jet can oscillate in a plane as vertical as possible to the surface to be coated of the pressure body, such as a printing roll, substantially as set forth.

"2. The modification of the method set forth in Claim 1, which consists in causing the vertically oscillating jet to move not directly over the surface of a roller but over an endless metal band which is drawn tight upon a roller and moves with it or slides over it."

II. Rolff's Roller Patent.

Ernst Rolffs, of Siegfeld, near Siegburg, who has been associated with Dr. Mertens in part of the development of the machine-printing of photogravures, made the following claims as far back as 1899 (Patent No. 16,944 of that year):—

"This invention relates to a process for the production of roller surfaces for printing by photography, whereby the ordinary process of engraving is dispensed with.

"Many experiments have been made to obtain roller surfaces for printing purposes by means of photography, but up to now no serious results have been obtained.

"Generally the roller surfaces had to be engraved whereby it was necessary that the patterns were arranged so that the surfaces determining the etched design formed one single line, in order to prevent the ductor of the printing machine to engage into the lines of the drawing, thereby destroying them.

"Hitherto it also was necessary to place the pattern in a plane inclined to that of the blade of the ductor.

"I have solved the problem of producing roller surfaces by photography, and hereafter beg to give an example.

"I take a negative or a diapositive made upon translucent film paper and transmit the same to the roller by pressure. The translucent film paper is provided with a net consisting of cross or longitudinal lines, known to everybody skilled in the art of photography.

"The roller to be treated is first covered with a substance sensible to the action of light, as, for instance, chrom gelatine. The negative is pressed upon the roller, the adhesion being increased by an oily substance introduced between the negative and the roller. The roller then is presented to the action of the light, brought into the dark room, the negative and the oily substance is removed, the roller is washed and then etched in usual manner.

"The etched picture consists of engraved points or lines, which are determined by a net corresponding to the net previously applied to the translucent film paper. When a net of longitudinal lines is not employed but one consisting of cross lines, care has to be taken that the lines of the picture do not run parallel to the blades of the ductor, but inclined to the same.

"By means of this arrangement it is possible to prevent any possible engagement of the ductor into the lines of the drawing whereby the picture during a short time completely would be destroyed.

"From the aforesaid it will be seen that when the translucent film paper containing the negative or the diapositive is arranged in a certain manner upon the roller, the picture can be transmitted to the roller by photography and rendered visible to the eye when etched.

"Hitherto this only could be effected by the troublesome procedure of engraving;

whilst when the ordinary process was employed, the production of a roller surface of same dimensions can be produced by means of my process in about one to three days. Generally it will be advantageous to employ photography, as the patterns evidently are more correct than those engraved by hand.

"When the patterns have to be repeated several times upon one single roller it is advantageous to transmit the same to a plate and apply the plate to the roller in the manner usually employed.

"What I claim is:—

"A process for the production of roller surfaces for printing by photography, in which a negative or diapositive is made upon translucent film paper provided with a net, the negative being transmitted by pressure to the roller rendered sensible to the action of light by means of chrom gelatine, the negative then being copied and the roller after removal of the negative and washing of the parts, which were not presented to the action of the light, etched, substantially as described."

Rattening in the Engraving Business.

"RATTENING," or the destroying of tools and materials by a workman who is leaving a job, has not, we believe, been the subject of litigation in the process engraving trade until this month (July). The term is an expressive one, with some little difference of opinion as to its exact meaning and origin. By some it is applied to the injuring or dislocating of tools, etc. (as the blunting of a set of edge-tools, or the "pieing" of a forme or mixing of "sorts" in cases of type) as an act of revenge by a man under notice to leave his work. It is compared to the supposed wanton damage done by rats (or rattens) before they desert a doomed ship. Also it is applied to wilful damage said to be done when there is friction between an employer and the trade-union; and attributed to the rats—sometimes it is the office cat.

The case in our own trade was an action brought by Martin Greenwald and the British Metal Engraving Company, Ltd., of Kingston-on-Thames, against William Kellner, a late employé of the company, on July 11th. The evidence went to show that the business was engraving, by a patented process, in the course of which certain secret formulæ and mixtures of chemicals were used. The employés were Germans, who had special knowledge of the trade. The works manager, named Gmach, was dismissed about the end of May, and made arrangements for starting an opposition business. A day or two afterwards the plaintiff asked the defendant what he meant to do, knowing that he was very friendly with the dismissed manager, and the defendant said, "I will stay with you until Gmach is ready, then I shall join him in his business." A few days later, on June 9th, the plaintiff received certain information and went to the studio, of which defendant had sole charge, and of which he then carried the only key. He found that almost all the labels had been scraped off the chemical bottles and the bottles had been mixed. Defendant was asked how this had happened, and at first attributed it to the heat of the place, but afterwards admitted that he had done it "to prevent anyone using the chemicals or interfering with them." In the absence of the labels the chemicals were useless. Their value was about £30, and about £20 had actually been spent in replacing part of them.

The defence urged that there were not more than from £7 to £10 worth of chemicals, that the injury done by removal of the labels was trivial, and that the action was malicious, with a view to securing a conviction so that the defendant might be deported as an undesirable alien.

This was denied, and a remand was granted, the defendant giving his personal bail for £25 and one surety for the same amount.

("The Process Photogram.") August 1910

Dangers of Machine Etching.

I WAS pleased to see my letter on the "Escape of Acid Fumes" during the improper use of the blast etching machine had received such prompt consideration from the makers. I read with much interest Mr. Gamble's reply, and hasten to assure him that my letter was in no way inspired by any rival vendor of machines, but was written with sincere desire of encouraging the operators and makers of such devices to themselves do all they can to maintain healthy conditions. The only reason I singled out the blast machine was because in regard to the important considerations of ventilation it has peculiarities entirely its own. And my association of this particular machine with an American (Chicago is my error) engraving plant is surely excusable. I am sorry I cannot see with our editor anything in the original paragraph ("Death in the Etching Machine") to allay fears. Perhaps I am mistrustful of happenings in America, which would account for my curiosity as to details.

But before dismissing the particular Brevity of the May *Process Monthly* (which in this discussion can very well be ignored) I doubt very much whether Mr. Gamble's hypothetical broken carboy would account for the difficulty to secure workmen to face the conditions. If I am not trespassing too much on your interesting columns I should really like to return with a few more words to my theory.

I have read carefully Mr. Gamble's letter, but must confess I still stand by my argument.

Further, I derive some satisfaction from the fact that I detect a possibility of Mr. Gamble adopting my suggestion: the sole object of my letter would then be attained. He writes:—"It seems, like most inventions, the acid blast will have to be made 'fool-proof.'"

Precisely what I mean, though rather an indelicate way of putting it.

If Mr. Gamble were constrained to perform his various editorial duties in the same room with a couple of busy blast etching machines I have a strong presumption that he would show a prejudice in favor of the "fool-proof" type.

I beg humbly to submit that my theories are based on a twelve months' acquaintance with the machine. I would not suggest that Mr. Gamble's acquaintance is less intimate than my own, but certain am I that he has fallen into error when he writes:—"The fact is, the more the valve is opened the less the pressure." He is talking of the working valve (see previous sentence) and evidently thinking of the exhaust (see next sentence). The three sentences mean nothing. When I spoke of the working valve I had in mind the inlet to the aspirators. The working valve and the exhaust valve are inseparable. In opening the working valve the exhaust valve is closed, and in partially opening one the other is partially closed. About two pounds pressure is generated when the "blower" is started, which all goes through the exhaust. By admitting about half of this into the aspirators we simultaneously half-close the exhaust, and this would seem to be about a safe pressure.

I say about a safe pressure, for there are so many disturbing considerations to take into account that it is impossible to theoretically decide that pressure. Reduced to simple terms, I would define a healthy and safe pressure as the pressure at which there is obtained a *balance* between the withdrawal of air from the acid chamber to feed the blower and the air ejected through the aspirators plus the gases evolved in etching the metal plus the expansion through heat. When this balance is upset on the wrong side, working conditions must be worse than when using an open bath, so why not make this condition impossible?

Globules of raw acid, I must admit, is clumsy phraseology, but I wished to draw a decided distinction between a fine rarefied vapor such as pervades the atmosphere near an open bath of diluted acid and the tangible globules of acid obtained by vigorously agitating acid into a fine spray. It is merely a difference of quantity, I suppose; and by raw acid I mean, well, let us say, acid alive and seeking employment. As to whether I would rather drink my acid with or without, I would much prefer not to drink it at all, if it would make no difference to Mr. Gamble.

Am I right in my contention? If so, the remedy is simple—a small collar on the valve rod; the need of it, human nature.

In conclusion, I wish to insist that I have no prejudice whatever against the machine in question, and should be very sorry to again have to work under the old system. And it is only fair for me to say that from a *workers'* point of view this machine, when properly operated, leaves nothing to be desired either in the way of healthy conditions, speed, or cleanliness.

FRANK ROBINSON.

The New Green Book.

It might seem impossible to issue a reference-book, principally consisting of names and addresses, that should be on new lines, and yet useful. This has just been done by "Whitaker," with the help of Douglas Sladen and W. Wigmore as editors and compilers. Moreover, the book is calculated to be very useful to our own readers—photo-engravers and illustrators of the press. *The Green Book of London Society* is described in its sub-heading as "A Directory of Celebrities," and its first distinctive feature is its plan, including all the people whose names are likely to be needed by a hostess in London. Its directory of the nobility and their relatives—some 15,000 persons — with the principal official personages, members of Parliament, etc., occupies over 400 pages, and gives a great amount of the most necessary information, condensed to the smallest possible space. Part II., "Whom to Hear and What to See," gives lists of prominent speakers, preachers, lecturers, entertainers, the Sights of London (sufficiently catholic to include W. H. Smith & Sons and Mudie's Libraries, and "The Times" Book Club) and the principal clubs. Part III. treats of Art, Literature, Music, the Drama, and Science—giving such lists as the Pen-names of Authors; pseudonyms of musical, sporting, and theatrical celebrities; and details of the principal societies, clubs, exhibitions, museums, dealers, critics, periodicals and persons connected with the subjects to which it is devoted. Part IV., "Sports and Hobbies," has a Calendar of Sport for 1910, and particulars of the organisations, publications, and people interested in aeronautics, amateur theatricals, angling, archery, athletics (to mention only the five branches listed under "A") and almost all other branches of sport until we conclude with yachting.

We have examined the book with some care, and are much struck by its inclusiveness and apparent accuracy. Its methods are often novel, and distinctly good, as in the arrangement whereby some acknowledged authority on a subject has been induced to select a list of fifty, or a hundred, or some other number, according to the importance of the subject, of the best exponents.

We only note one fault in the book, the extent to which it ignores photography. It gives Sir Wm. Abney amongst the leading men of science, and five photographic journals (three weeklies and our own two monthlies) amongst the hundred leading London papers; but the R.P.S. is not in the list of Scientific Societies and Institutions; and the photographic exhibitions are not amongst the London Exhibition Societies, etc., in the Art section. In spite of these minor omissions we think that photographers will be amongst the best buyers and users of the book, the price of which is a modest five shillings.

The Graphic Arts and Crafts Year Book, 1910.

This American annual review of the printing, engraving, and allied industries is again a monument to the industry of Joseph Meadon, the editor, to the faith of the Republican Publishing Co., to the enthusiastic co-operation of many photo-engraving concerns, and to the supreme importance of our own craft in the printing world. The illustrations are the special features, and a large proportion of these are designed, reproduced, and printed, complete, by the Barnes-Crosby Co., Chicago; the Binner-Wells Co., Chicago; Brown & Bigelow, St. Paul; the Cargill Co., Grand Rapids; Corday & Gross, Cleveland; the Gerlach-Barklow Co., Joliet; the Mugler Engraving Co., Cleveland; Norman T. A. Munder & Co., Baltimore; the F. A. Ringler Co., New York; and the Zeese-Wilkinson Co., New York.

Amongst the writers of articles are many well-known names — Stephen H. Horgan, Arthur Payne, A. J. Bull, Otto Mente, N. S. Amstutz, Auguste Lumière, Dr. Henry E. Kock, Henry O. Klein, Prof. Albert Korn, T. Thorne Baker, C. G. Zander, Dr. C. E. Kenneth Mees, F. J. Tresize, Walter C. Kelley, and A. C. Austin; while men whose names are less familiar also contribute useful matter.

A young friend who has been poring over the book describes it with enthusiasm as "full of sumptuosity," and such a description is quite apposite as regards the production. With all its fine show, however, the work is essentially and extremely practical, teaching by precept as well as by example, what are the modern possibilities of the illustrative craft. It also has good matter for the pressman, the compositor, the bookbinder, and other representatives of the allied trades, but first in pride of place, in extent and quality of representation, comes the photo-engraving section.

A few copies of this Annual are reserved for the British market and will be in the hands of our own publishers. Price 21s. net; postage, inland, 6d.; foreign, extra (weight 4½ lbs.).

("The Process Photogram.") August 1910

Etching on Iron or Steel for Printing Purposes.

C. C. Roder claims a patent for a process of etching on steel or iron, which consists essentially in subjecting the plates to a preliminary treatment with slightly acidulated liquid, which scours them, and makes fatty substances adhere. The transfer, in printing ink, is then applied to the plates, which are then treated with a stronger acid which renders the parts uncovered by the transfer ink grease-repellent. Finally the plates are treated with a still stronger acid, and this increases the power of the naked parts to prevent deposits of fatty matter, and at the same time makes the borders of the transfer print more distinct.

Each of the etching baths contains two acid components, composed of free acids or acid salts. One of the compounds comprises phosphoric acids, *i.e.* ortho-meta or pyro-phosphoric acid, as also acids of fluorine, arsenic, antimony, molybdenum, sulphur, or acid salts, provided that they are soluble in water or in the second constituent of the etch. This second constituent is a chrome or manganese acid, and generally an acid possessing about an equal degree of acidity, and an acid salt which they form with potassium, sodium, ammonium, cæsium, lithium, calcium, barium, strontium and the light metals, on condition that they are soluble in water or in the first component. Chromic acid can also be utilised or its salts mixed with hydrogen peroxide.

The new process can be applied as follows: The plate is scoured for eight or ten minutes in a bath of 2000 parts water, 40 crystallised carbonate of soda, 33 orthophosphoric acid (s.g. 1·154), and 17 parts potassium bichromate, then washed in pure water and dried.

The plate is now fit to receive transfers. After application of the print to be transferred and cleaning up, the plate is treated with an etch of 400 parts of water with 80 of ortho-phosphoric acid (s.g. 1·154), chromic acid 6 parts, sodium bichromate 26. This mordant attacks the plates and makes them yet clearer. The biting-in can be made very deep with this etch and all impurities removed.

After necessary corrections have been made, the plate is treated with a final etch of 100 parts of water, 45 potassium phosphate doubly acidified, 15 potassium fluoride, and 1 sodium bichromate. This makes the surface free from ink incapable of receiving fatty substances, and renders all further etching unnecessary.

"QUALITY pays handsomely–it is the best and only lever to raise prices and increase profits. ❧ The customer you hold by the slender thread of low price is here today and gone tomorrow; the customer you hold by service and quality is bound to you–a permanent asset of your business."

From "Printing for Profit," by the Lanston Monotype Co.

Business.

W. H. Say & Co., photo-engravers and wood-engravers, have removed from Whitefriars Street to 10 Farringdon Avenue, London, E.C.

Reckard Engraving Process, Ltd.—Registered capital £5000, in £1 shares. "To carry on business as indicated by the title." Private company.

The partnership between E. Judge and J. E. Skelton, trading as the Yorkshire Gravatone Company, process engravers, etc., at 1 Barwick Street, Scarborough, has been dissolved as from September 2nd, 1909. Debts collected and paid by J. E. Skelton.

H. Graham Glen, Wortley, Ltd.—Registered capital £2000, in £1 shares. To carry on the business of a collotype, lithographic and general printer, photographic engraver, publisher and commercial photographer, carried on by H. G. Glen, at Greenside, Lower Wortley, Leeds. Private company. Office, as above.

Rotary Photogravure.—The rights in the Mertens process have been transferred to a company just formed by Dr. Mertens, and it is reported that the sole rights for job-printing purposes have been sold for several years to come. Licences for use of the process in newspaper printing are offered at £600 for one year, £1200 for three years, £1500 for five years, or £2500 for the full term of the patents.

Publications.

"The Art of Illustrating, and Preparing Illustrations for the Press," is a book written by W. Brett Plummer, the well-known representative of John Swain & Sons, Ltd., and published by H. J. Goss & Co., Ltd., Gray's Inn Road, London, W.C.

Specimens and so forth.

Gebrüder Delgeur & Co., of Houttuim 54, Rotterdam, send us their monthly calendar-card with regularity—a useful reminder and specimen of their work. The half-tones are excellent. They are not shown at their very best on the matt-surfaced card, yet we sacrifice something of brilliance, without regret, for the pleasant appearance and comfortable "handle" of the matt card.

School Notes.

Bolt Court Prizes.—Each session a number of prizes valued at £2, 2s. each are offered by firms and others interested in process work. The following are the awards for the session 1909–10:—

Class.	Offered by	Awarded to
Map and Plan	G. W. Bacon & Co., Ltd.	H. F. Smith.
Line Etching.	Gee & Watson, Ltd.	W. J. Hall.
Three-color.	A. E. Dent & Co.	E. L. Turner.
Screen Negative.	Carl Henschel, Ltd.	H. A. Key.
Half-tone Etching	Hunters, Ltd.	A. A. Hilditch.
Lithography.	Master Printers' Association.	P. Stacey.
Preparation of Originals.	Penrose & Co., Ltd.	W. J. Bouts.
Photogravure.	*Process Engravers' Monthly.*	G. Udloff.
Design.	Sir Joseph Causton & Sons.	Miss W. Baker.

St. Bride's Technical Institute is to be congratulated on having secured, by the courtesy of the L.C.C. Board of Technical Education, and with the approval of the Advisory Committee of the Bolt Court School, the services of Mr. A. J. Newton as head of the St. Bride's technical education side. It is distinctly provided that the work of Bolt Court shall not be allowed to suffer, and Mr. Newton's zeal and thoroughness will guarantee the observance of this proviso. In fact, the net result of the new appointment should be beneficial to both schools. It has long been felt that the schools were sister organisations and they have co-operated in many ways, but their more perfect correlation will be gained by the unity of control. This will be all the more efficiently worked from the fact that Messrs. Harrap and Drummond and the rest of the excellent St. Bride's staff remain at their posts and will continue all the old effort that has run St. Bride's so well in the past.

Efficient technical education is perhaps the most important of all factors in our world-competition, and it is satisfactory to feel that our own craft has it in full measure.

Bolt Court School.—The report on the fifteenth session, from 20th September 1909 to 30th June 1910, shows that the number of individual students who entered the School during the session was 544, a decrease on last session, mainly accounted for by the falling off in entries to stationery and papermaking lectures. This decrease had been foreshadowed in the last two reports.

The position of the students can be classified as follows:—

Under preliminary training	312
Apprentices, learners and improvers	209
Assistants and journeymen	6
Managers and foremen	17
	544

Students attended from 219 different firms. One firm sent eleven students, two firms sent ten students, and six from six to eight students each.

The following summary shows how the activities of the students have been distributed:—

Students entering only for photo-engraving classes	252	263
,, ,, ,, ,, lectures	11	
,, ,, ,, art classes		163
,, ,, ,, lithographic classes		35
,, ,, for both photo-engraving and art classes		6
,, ,, ,, lithographic and art classes		11
,, ,, ,, photo-engraving and lithographic classes		1
,, ,, only for papermaking and stationery lectures		65
		544

The attendances have been slightly better than last year, both as regards regularity and hours attended.

Brevities.

The Liquid Litho Drawing-Ink of Hunters, Ltd., has many uses for process engravers, as well as for lithographers.

The Bemrose Fire Brigade of printers and process men rendered good service in extinguishing a fierce fire at a distillery and yeast works near their own factory.

The new Penrose pamphlet on the proper use of the Metzograph screen should be in the hands of every reader. Free in response to a post-card to Penrose & Co., Ltd., Farringdon Road, London, E.C.

A fire that did some damage (by water and smoke) to the premises of the Half Tone Engraving Company of Farringdon Avenue, E.C., occurred on June 17th. It originated in a stockroom of Wakefield & Sons, wholesale stationers, whose whole stock was consumed.

The British-made half-tone screens of F. E. Brown & Co., Guthlaxton Street, Leicester, are the subjects of a price-list which will be sent with pleasure, free of charge, to any firm using half-tone screens. As we have often said before, these British-made screens are excellent in every way.

The Corkett process of machine-printed photogravure is being established in America, where Mr. Corkett himself is in charge. In England the rights have been sold to a great printing concern, and the Corkett Photogravure Syndicate, Halton House, Holborn, W.C., has been formed to deal with the rights in other countries and colonies.

The process dry plates recently placed on the market by Messrs. Hughes & Kimber are now being sold by Messrs. John Haddon & Co., who have been joined by Mr. Kimber. In addition to these plates the firm will handle certain other important process specialties, in a new department to which Mr. Kimber is devoting his whole attention. It is significant that this great firm of printers' engineers should be taking up process work in such real earnest. It is but another of the many evidences of the growing importance of the photo-mechanical craft.

Try-dents Visit Neptune.—A. E. Dent & Co., Ltd., celebrated their fourteenth birthday by beanfeasting at Brighton. Leaving London at 8.30 a.m. by Cook's excursion, they had ample time for a morning sail, which we illustrate. Dinner was spread at the New Ship Hotel and punctuated with all customary toasts. Tea at 5.30 and the return journey at 7.55 completed a most enjoyable day. Expenses were again divided equally between the firm and the employés; the stewards, as on all previous occasions, being forbidden to solicit outside subscriptions.

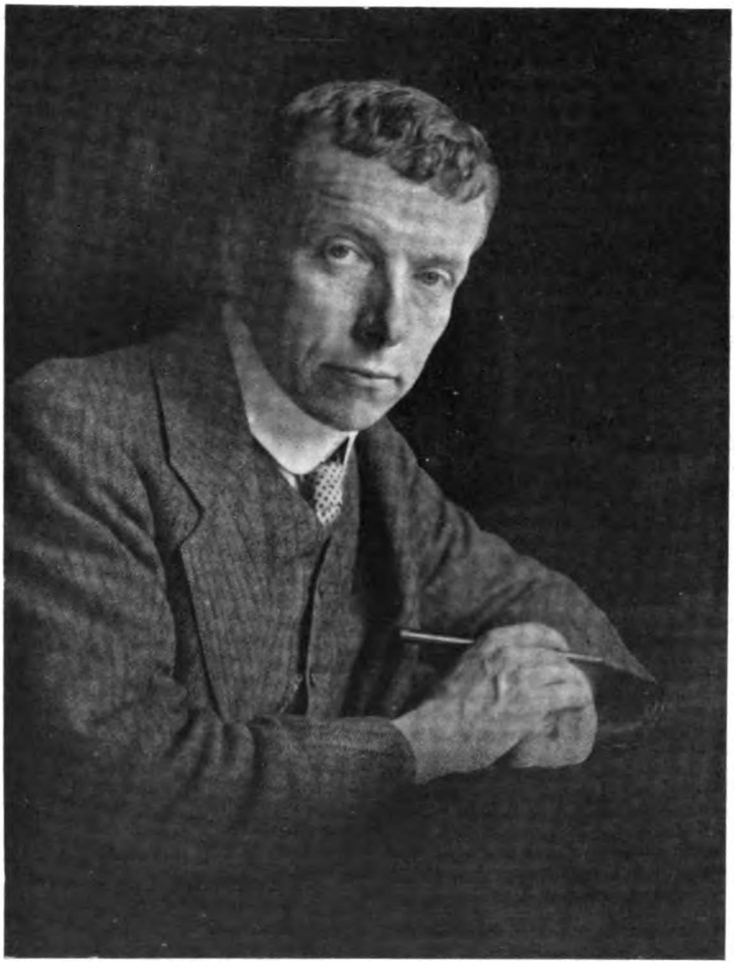
British publishers are beaten by the Americans in the matter of illustrated magazines, not because the Americans have better authors, illustrators, blockmakers, printers, or purchasing public, but because they have better postal rates. The "second-class mail matter rate" of two cents (one penny) per pound enables magazines to include the postage in their published price. This has led to very general distribution of good educational, instructive, and entertaining matter. It has led to the subscription system under which waste and cost of distribution are reduced to a minimum, and some eighty per cent. of the sales income is received in advance, in the first two months of the year. Similar postal terms in Britain would make an immense difference to our own trade.

Aufermann's grain process, for which patent is claimed by Hans S. Aufermann, of Munich, consists of "A process for preparing printing plates in grain manner for monochrome and polychrome printing, consisting in preparing a chromated mixture of a solution of fish glue having a concentration varying between 1 : 2 and 1 : 6 and an aqueous solution of arabic mug having a concentration varying between 1 : 1 and 1 : 6, the proportions of mixing both solutions varying between 1 : 1 and 1 : 8, spreading the mixture as a coating over a metal plate, leaving the plate at rest so as to cause small drops of the arabic gum solution to settle in the said mixture of arabic gum and fish glue solutions, causing the said coating to dry so as to render the said drops of arabic gum resisting to the action of the etching, exposing the plate under a suitable image and directly etching the plate thereafter, with solutions of ferric chloride."

The Franz Münch Process worked out and patented in the principal countries by a practical lithographer—Franz Münch, of Wilsdruff, Saxony—is offered to the trade. It is based on the use of a single photographic negative, from which prints of varying intensity are made as guides for the chromo-lithographer. The patentee says:—"The theoretical basis of the process rests on the properties of the ordinary photographic plate. The effects of colors, or of the rays of light emanating from them, on the photographic plate vary considerably. For example, yellow is the most intense, and blue the weakest in effect. In photography yellow and blue represent the extremes, and consequently the yellow required in the printing plate for color printing is most perfect in a contact print. Now, in order to obtain the blue plate as nearly perfect as possible from the positive in printing out, the print must be made correspondingly darker. As regards their actinic value, all the other colors lie between yellow and blue, and can easily be obtained by working in accordance with and varying the directions given for obtaining the first two."

The Cleveland Guild of the Printers' and Kindred Trades, with Harold Hood of "ours" as President, shows a capital report and balance-sheet for 1909-10, the session just closed. We say this in spite of the fact that the adverse balance has increased from three to thirteen pounds during the year. The money has been spent on the best kind of educational work, and it is good to find a society with the pluck and energy to launch out boldly and to work even beyond its immediate resources, in a time when so many kindred organisations are stagnating and doing little work, but accumulating useless funds. Only one line strikes us as really unsatisfactory—that wherein the outstanding subscriptions are summarised. With such a programme as the committee provided, members should at least strengthen their treasurer's hands by paying up their subscriptions and removing the deficit. The annual exhibition shows subscriptions from firms and members to the extent of £20 7s., and a profit balance of £6 15s. 4d. to General Account. The membership shows an increase of six, and a total of 187. There was a picnic, a summer excursion, eight lectures and five discussions, an apprentices' night, a social, with whist-drive and dance, in addition to the exhibition, and good arrangements for technical classes were made in Stockton and Middlesboro'.

Several competitions, for journeymen and for apprentices, were arranged by various sections of the Guild, and the whole report speaks well for the management, which consists of:—Officers: Master, Mr. Harold Hood; Deputy-Master, W. G. Appleyard; Treasurer, W. H. Thomas; Auditor, H. Macgregor; Secretary, S. H. Walker. Executive Council: Messrs. W. Appleyard, A. J. Appleyard, R. Bagley, T. W. Bainbridge, H. C. Bunting, J. Carrick, J. Cooper, J. R. Gardner, J. T. Graham, G. Lowery, J. M. Roseweir, G. T. Simpson, J. Stuart, T. Woolston, H. Wilkinson.



MR HAROLD HOOD, F.R.P.S.,
Master of the Cleveland Guild.

Portrait by Dr. H. E. Drake-Brockman, F.R.P.S.

A little piece of exhortation which is given to the members may well be commended to similar societies. It reads:—

"Talk the guild *up*, *not down* — friendly criticism is useful and at all times welcome—but don't look for *all* the weak spots; there is no perfect organisation. The Guild does not belong to the master nor to the executive council, but to you, fellow-members, and on you individually, as well as collectively, depends what its future history shall be."

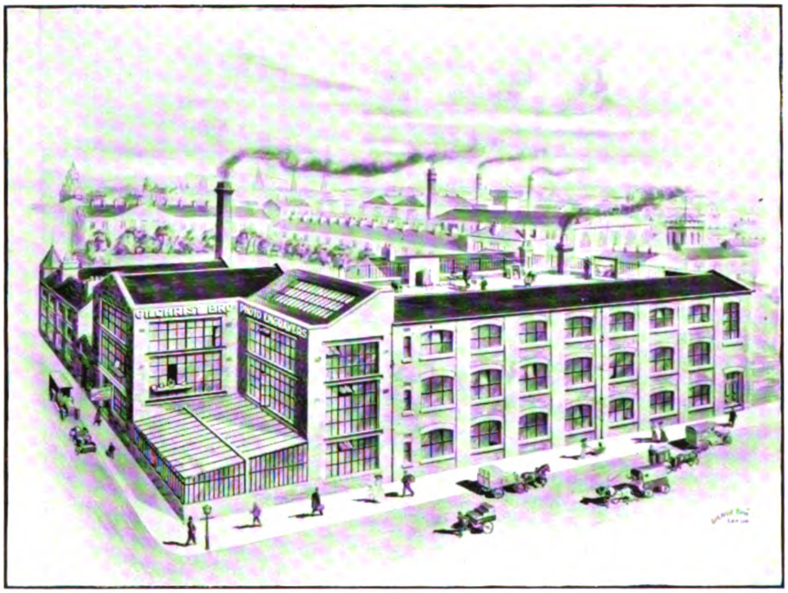
THE NEW GILCHRIST PREMISES.—We give a view of the new premises built and just opened by Gilchrist Bros., Leeds, now one of the largest process houses in the provinces. It may be interesting to notice the enormously rapid progress this firm has made.

It is merely a matter of ten years since they were one of the small houses, but by persistent attention to the quality of their work, irrespective of cost, they have now achieved a business which is more than six times greater than it was at its best in the old premises in Wade Street.

Seven years ago they built the first portion of their premises, everything being particularly and specially adapted for photo-engraving, laying in heavy concrete floors for the studios and machine rooms, to prevent vibration, and glazing the studio roof with plate glass, so that they could take advantage of the direct sunlight, having built their studio facing south in spite of all conventional ideas.

These premises they so rapidly outgrew that in the winter of 1906 the whole place had to be reorganised to make more room for further machinery and men, when they added to the departments a duplicating plant for their special nickels, an electrotying plant, and also a wood-engraving department.

By 1909 the demands were so great upon their space that it was necessary to rebuild. These operations are now completed, and the whole of three new floors fully equipped with modern up-to-date machinery and cameras in full working. One floor is specially reserved for the three-color department, with photographing apparatus to take negatives as large as 42 inches square in one piece. Here also is a poster half-tone plant which has recently completed one of the largest half-tone etched blocks in the country, namely, one for a poster 90 × 40.



Another special feature of the new building is the large flat roof specially designed for photographing articles direct, such as large oil paintings and other more bulky articles that can only be suitably lighted by a soft all-round light such as can only be gained in a highly elevated position.

An example of the high-class work produced in the color department was noticed in our last issue, p. 163, first paragraph.

Gilchrist Bros. are probably the largest firm north of London and outskirts who are fully equipped for every branch of photo-engraving.

For years all the etching has been done by the machine process, although they have not made a great fuss about it.

One of their strong points is that they are essentially a trade house, never catering outside the printing and kindred trades; and it may be safely inferred from the continuous support of the trade that the work must be of high excellence.

Checks on the press photographer seem likely to increase, and in this connection the power of public opinion has recently shown itself in a wonderful way. The motion-picture films of the Johnson-Jeffries fight have been actually or practically suppressed in many American cities; the London County Council has informed the proprietors of places licensed for kinetographic entertainments that the exhibition of these films is "undesirable," and the company that made the films has said that if the public opinion against them was general, they would suppress them entirely.

At the accident which resulted in the death of the Hon. C. S. Rolls, according to the reporter of *The Daily Chronicle*, "a disgraceful scene took place; people tried to force their way through; a little army of photographers endeavored to obtain snap-shots of the tragedy, and a cinematograph operator was winding the handle of his machine. This so infuriated the officials and a number of gentlemen that they seized two of the cameras, broke them to bits, and trampled them underfoot."

The photographers, like the reporter, were only doing their duty, and helping their papers to cater to the sensation-loving public, but it is well that the craze for ghoulish detail should receive a check from public opinion; and these cases show how very tactful the press photographer must be, if he is not to lose many of his present privileges.

The Photographic Annual (*The Figures, Facts, and Formulæ of Photography*) for 1910-11, which has been edited and largely written by E. J. Wall, F.R.P.S., forms an excellent supplement to the two earlier annuals of the series. To make room for new and important matter, some of the old sections have been omitted, while others have been cut down by the removal of alternative formulæ, and the omission of much that requires no change and that appeared in the volumes for 1908 and 1909. The photo-mechanical sections, for instance, are dropped entirely, so that the 1908 and 1909 Annuals, which are both in print, remain the most complete reference books for the process worker.

The new Annual has three principal articles, written by the editor, and dealing respectively with "Screen Plate Color Photography," "Stereoscopic Work," and "Notes on Development." Each of these subjects is treated about as fully as it would be in an ordinary text-book devoted to it alone, so that on three important topics the Annual is the completest standard authority, up to date.

The carefully revised sections, on all practical photographic subjects, contain the results of the world's investigation and progress to the beginning of the present summer, and form an invaluable reference work for the serious photographer. The increased use of diagrams is a good feature, and so is the list at the end of each section of the principal paragraphs on its subject in the earlier Annuals.

Mr. Wall has done his work very well and thoroughly, and the book should have a great sale at the reasonable price of 1s. net in paper covers, or 2s. net in cloth, interleaved. Postage extra.

IN THE HIGH COURT OF JUSTICE, CHANCERY DIVISION.

Friday, 29th July 1910.

Graphic Arts Company *versus* Hunters, Limited.

JUDGMENT:—Mr. Justice Neville.

The invention is stated to relate to a process of and apparatus for producing etched metal plates with particular reference to photo-mechanical engraving. The object is stated to be by the employment of a mordant to produce a printing surface of a more perfect character than that produced by the means ordinarily used, to reduce cost, and obviate many of the objections incident to the processes and means theretofore employed. The invention is said to include an essentially new process of applying the mordant, which is to be projected and atomised upon the plate so as to form cupped or concave indentations, also to embody the projection of the spray, so that the mordant impacted upon the plate will drop without flowing. I understand the concluding words to refer to the position of the plate face downwards. The combination of the mordant with the metal is said to be accelerated by the dynamic force of the impact, which, it is said, causes each atomised particle of the mordant to become practically saturated with the metal base instantly upon contact and to result in eroding the metal in the direction of the impact faster than the same action proceeds laterally; in other words, the tendency to reduce under-cutting is described as a result of the process. The forcible impact of the atomised spray is also relied upon as a substitute for the brush used to sweep the surface of the plate. I need not deal with the cooling effect attributed to the liberation of the compressed air, as in the view I take of the case it is unnecessary to determine whether the use of compressed air is an essential part of the process described. In describing his apparatus Fairweather further explains the advantages of spraying the plate face downwards, namely, that with the drops what is removed from the plate falls immediately therefrom, and says that cupped or concave indentations are at all events partly produced by the shape of the drops of the etching fluid. The latter view is not supported by the evidence. He tells us that etching by projecting the mordant in the form of spray upon the metal effects a great gain in rapidity of operation, as a much stronger etching fluid may be used. In his apparatus Fairweather provides means for insuring the equal distribution of the mordant over the surface of the plate. He does not refer to this in the description of his process, and the evidence is to the effect that it was common knowledge that it was necessary to secure, by some means or other, equal distribution. It is to be observed that the inventor in describing his process takes credit for acceleration by the dynamic force of the impact. This becomes of importance when we consider the meaning of his first claim. At the date of the letters patent plates had been held face downwards in a tub of acid, and Truchelut, in an addition to his patent for the use of sand and acid for etching, had published the fact that a plate could be etched by dashing the mordant finely distributed and under great pressure against the plate. In his original patent he had claimed the projection of sand and acid by means of a blast against the surface to be engraved, and had diagrammatically shown an apparatus which, with a slight alteration to the mouth of the tube through which the mixture was to be projected, requiring no invention, would be capable of projecting acid finely distributed against a plate. In this specification the position of the plate is not disclosed, but the diagram shows it in an upright position. I cannot so distinguish between Truchelut's finely distributed acid and Fairweather's spray so as to find invention in the use of the latter with knowledge of the former. It was known to etchers that you must not destroy the resist, and that the mordant must be equally distributed over the plate. I think, therefore, that, apart from the entire combination of every part of his process, the only novelty he can lay claim to is spraying the plate face downwards. Fairweather's invention has nevertheless been deemed a sufficient foundation for no less than seventeen separate claims, and I have now to consider whether these claims, upon a fair construction of the whole specification, are confined to the entirety of the process described or to the novelty mentioned above, or whether they extend beyond Fairweather's invention.

Taking the first claim and omitting the reference to the use of compressed air, the claim is for spraying a metal plate so that the dynamic force of the impact will accelerate the chemical action of the mordant for the purposes set forth. The purposes set forth I think are to produce a printing surface upon metal as described in the early part of the specification. Unless I can read "for the purposes set forth" as adding to the first claim the feature of the process, which consists in spraying the under-surface of the plate when in a horizontal position, a feature which is introduced into other claims later on, but as to which the first claim is silent, I find nothing described in this claim which was not disclosed in the second Truchelut. As I have said before, I think, "for the purposes set forth" have a different meaning. The acceleration of the chemical action of the mordant in etching by spraying it against the face of the plate is one of the advantages he has previously attributed to his process, and I understand his first claim to extend to obtaining such acceleration in this way for the purposes of etching. It is unnecessary to go through the other claims, several of which appear to be open to similar objection, in detail.

I have been invited to read the whole of the first ten claims as each claiming the whole of the invention described from different points of view, but the words used will not, I think, allow of it. The claims appear to me to be addressed to different combinations of the various parts of the process. I am informed that, according to American law, the invalidity of one or more claims does not invalidate the rest. This may possibly explain the character of the claims. Be this as it may, I think Claim 1 is too wide, and on this ground that the lettters patent cannot be supported.

The action must be dismissed with costs. I certify for the Objections 4 (*a*), (*b*) and (*c*) so far as the documents were referred to.

Mr Frost.—Does your Lordship certify, with regard to the first and second objections, as to who was the first and true inventor and the subject matter?

Mr Justice Neville.—No.

Estab. Jan. 1894.
"The Process
Photogram."

THE PROCESS
ENGRAVER'S
MONTHLY

VOL. XVII. No. 201.
SEPTEMBER 1910.

Edited by H. SNOWDEN WARD, F.R.P.S., Founder of *The Photographic Monthly*.

IN THE HIGH COURT OF JUSTICE, CHANCERY DIVISION.

BEFORE MR. JUSTICE NEVILLE.

The Graphic Arts Co. *versus* Hunters, Ltd.

July 6th, 7th, 8th, 11th, and 12th, 1910.

Abridged from the shorthand notes of Messrs. Marten, Meredith, & Co.
and Messrs. G. Walpole & Co.

Counsel for the Plaintiffs.—Mr. A. J. Walter, K.C., and Mr. J. Hunter Gray (instructed by Messrs. Blundell, Gordon & Co.).

Counsel for the Defendants.—Mr. J. M. Astbury, K.C., and Mr. Robert Frost (instructed by Messrs. W. J. & E. H. Tremellen, agents for Messrs. Blair & Seddon, Manchester).

(*Continued from p.* 173.)

Second Day, July 7th.

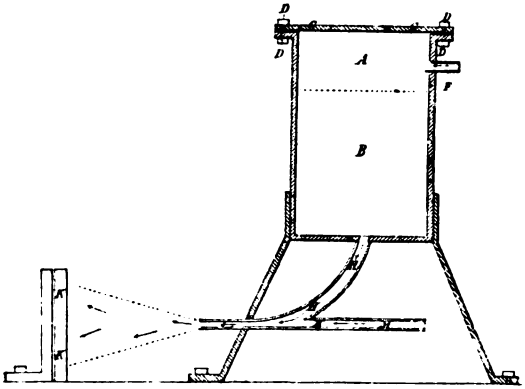
Cross-examination of Mr. Horatio Ballantyne, continued by Mr. Astbury. — In Mathewson's sand blast patent the sand fell downward on the face of the object to be engraved, which was laid horizontally face upward.

The witness knew nothing of the position or reputation of the inventor Truchelut; the Truchelut method could not be used for half-tone etching. He did not think that anything in the patent indicated that it was to be used for half-tone work; the mention of etching or abrading suggested the use of sand and force all through, and all abrading would be harmful in half-tone work. There was no mention of an atomiser, and the diagram showed a plain pipe-end, not an atomiser.

In the paddle method (Mark Smith's) the liquid was thrown upon the plate in a state of fine distribution, by centrifugal force and air-pressure.

(A model of the Truchelut machine, marked H.B. 1, was here put in.) Mr. Ballantyne pointed out that the model differed from the specification in having the pipe constricted to form a nozzle. In making his own apparatus he had used an open unrestricted pipe, as shown in the specification. Material forced through the pipe would issue in fan shape, as shown in the drawing, without any nozzle.

(A second model, H.B. 2, introduced.) The witness admitted that constriction of the end of the pipe, as shown, was a clumsy method of causing a liquid forced through the pipe to issue as a spray. If he wished to use such an apparatus for etching he would want means to control the pressure of air in the liquid-containing vessel; to control the air introduced to atomise the liquid; and to keep the plate moving all the time, to secure even distribution of the spray. Also, he must not drive the mordant hard enough to smash the resist.



The Truchelut Etching Machine. This diagram, from the patent specification, is the subject of frequent reference in the evidence given in this issue, and in that which will follow next month.

In Brooman's patent, if a plate were put in place of the calico for which it was intended, there would be a spraying of mordant upon a plate laid horizontally, but this would not be the plaintiffs' process unless there was movement of the spraying apparatus or of the plate, to get uniform distribution.

The witness admitted that proofs on paper would not show the difference between plates etched by the plaintiffs' process and (by skilled workmen) by previously known processes.

A number of proofs, from plates etched in different ways and by different machines, were submitted, and witness said that they gave him no clue to the method of etching. The proofs were unequally inked and most of them greatly over-inked, which increased the difficulty of detecting fine differences of dot-structure. He could not tell, from the proofs, whether there was under-cutting or not, and would not expect to be able to do so.

Three etched pieces of zinc (A, B and C) were handed to the witness, who pointed out that the resist was gone from one, so the results were not comparable (see *; later).

Three photo-micrograms of sections of etched plates were handed in, and witness said they were so bad, photographically, that he could form no definite opinion about them.

A proof was handed to witness, and said to have been produced in a hurry. He said it was very good work, might have been done in an hour, and by tub-etching, without retouching, if the negative were perfectly good. He would be surprised to learn that the block had been produced by tub-etching in about the same time as was said to be required by the plaintiffs' process. If shallow etched it could be done in six minutes.

Turning now to three prints from blocks etched in models of the Truchelut machine, made with one, with three, and with six jets. Witness had not begun his experiments, feeling sure of failure. With one jet he felt sure he would fail, with three he was doubtful, but with six he expected to probably get over the difficulties. In No. 31 the spray destroyed the resist. He squirted the mordant all over the plate to get an average depth of etching, watching the outer zone until it was rather under-etched. In that time the centre was all eaten away. An engraver would know that one must not use an apparatus that would destroy the resist. In the three-jet etching the dots were completely eaten away opposite the jets, before other parts of the plate were sufficiently etched; and a similar thing happened with six jets. In the six-jet case the mouths of the jets were 8¼ inches from the plate and wire gauze was placed between, in an effort to break up the spray and make it strike evenly. In another case the plate was 14 inches from the jets. Even at 8¼ inches each jet more than covered the plate.

Three etched plates (see *, p. 198) were now produced, the resist having been removed from all. Witness said A seemed to be spray-etched and C tub-etched, but he could not make out B, which was too dirty to allow him to see the dot-structure.

Later, the cleaned plate was said by witness to be a nice etching, in which he could not recognise the characteristics of spray etching.

It was not necessary to have compressed air or nozzles, but it was necessary to have atomisers and to move the plate, to get plaintiffs' results. It was not necessary, but advantageous, to have the plate face downward. The spray should strike the plate substantially at right angles. When placed at an angle there was tendency to under-cut one side of the dot. The plaintiffs' process gave with certainty, and without skilled watching, results which the older processes only gave when worked with great care.

Re-examined by Mr. Walter.—The witness could not define "project," but it did not mean much. When the plate was not at right angles to the spray the tendency to undercut was not always in the same direction; it seemed to depend on the quantity of liquid. It did not matter whether the plate or the spray was moved to get equal distribution. Not only sheets of plain tone dots but also picture subjects had been made with the model of Truchelut, with one, three and six jets and at different distances. All were quite useless for half-tone printing purposes.

If it was only desirable to roughen the surface of the metal for decorative purposes, the evenness of distribution would be sufficient, but this method could not make etched plates for printing.

Excellent proofs could be made from shallow plates, even from plates which had not been etched at all, by inking the developed resist.

The better results with the Truchelut model were obtained with the greater distance between jets and plate. He had worked exactly to the specification, and also with other forms of nozzle. With a larger tube and constricted nozzle the result was the same as with the open tube shown in the specification.

Adjourned for the model to be dissected (see †, p. 200).

A copy of *The Process Engraver's Monthly* and a circular of Hunters, Ltd., were put in; the descriptions of the Mark Smith machine were read, and the witness agreed, substantially, that they were correct.

A model of the paddle in this machine was handed to witness, who said that the four paddles mounted on one spindle had their rows of holes "staggered," or not all at the same distance from the end of paddle, so that uniformity of spread of solution was secured. The liquid was projected through the holes when the paddles revolved rapidly, and stuck in a spray across the whole surface of the top of the etching machine. A shelf at the end of the machine opposite to the paddles prevented waves of solution being dashed on to the plate. The motion of the paddle over the whole surface of the plate was equivalent to the moving of the plate in the plaintiffs' apparatus.

Brooman's, West's, Hancock's, Sachs', Mathewson's, and Breadner's patents suggested nothing that could be advantageously used in photo-engraving, or on which plaintiffs' process could have been based.

Returning to Truchelut's patent, sand-blast was used for making broad patterns on metals, for ornamental work, and for roughening metal; for cleaning up castings, sharpening files, cleaning stone-work, etc., and for engraving glass and marble. The Truchelut specification stated that sand-blasting had not been applicable to "relatively supple and pliant substances, the molecules of which can be displaced by the rain of powder without being detached," and quoted zinc, copper, steel, gold, silver, platinum, aluminium, horn, ivory, marble and wood as examples of such substances. It claimed to reveal a process applicable to all substances indifferently "by the combination of the abrading action of the blastpropelled powder with the solvent action of a chemical."

The witness could not understand Truchelut recommending nitric acid for engraving copper if he were a great engraver. He had never heard of gold, silver or platinum being used for printing plates, but the sand-blast was used for roughening these metals and bringing out a pattern in jewelry. The patent stated that "some substances are capable of both abrading and chemical actions, such as perchloride of iron upon copper," but the witness could not conceive of perchloride being in a state to act as an abrading solid and an etching liquid at the same time.

The witness understood the patent to be an attempt at a reinforced sand-blast, and he could not understand anyone reading it so as to use liquid only. The additional patent referred to certain cases in which liquid only might be used, but it applied only to things mentioned in the main patent, and there was no suggestion of photo-mechanical engraving.

In applying a nozzle or constriction to the pipe, to get diffusion of the spray, he would be going against the patentee's idea, by reducing the force of the projection, on which great stress was laid.

(Dissected model produced. See †, p. 199.)

The discharge from a nozzle could be altered by altering the angles of the sides of the nozzle. He had not tried to work with such a nozzle as was in the model; there was nothing of the kind in Truchelut, which would lead one entirely away from this. The tap which was placed on the pipe would enable the supply of liquid to be regulated in proportion to the air-current. Moist sand could not be blown through it, though a liquid could.

Sand-blast on brass and copper was used for name-plates, finger-plates, and ornamental work.

The witness still thought that plaintiffs' process was very novel for the date of the patent.

Further cross-examined by Mr. Astbury.—As to some of the proofs from plates made with his own model of the Truchelut machine, witness could not admit that any appreciable portion of the plate was good. The etching was very uneven, in the best part. A novice in engraving would see that there was a great deal of "bottoming," caused by etching away the resist, and would know that this should not be. The defects were the results of spray plus washing.

Certain prints produced, and accepted by witness as "very good" examples of mechanical work and "very ordinary" examples of catalogue work respectively. He thought that both could be made on plaintiffs' apparatus without touching up. Two examples of art work were pronounced "quite ordinary," and capable of being made by plaintiffs' apparatus without hand work.

Witness had not heard that some of the finest houses refused to etch by machinery. By looking at the proofs he could not tell how the plates were produced. He could not admit that the work was so good as to be necessarily tub-etched, nor that if it had been done in the machine it would have needed the same amount of handwork.

Further re-examined by Mr. Walter.—In certain prints produced the negative had been worked before the making of the block. This was quite usual in catalogue work.

Mr. Alfred Edwin Dent called, and sworn.

Examined by Mr. Walter.—Said that he was a process engraver, and at the end of 1907 saw a demonstration of the Mark Smith machine at the premises of Hunters, Ltd. The machine was similar to that drawn in *The Process Engraver's Monthly.** It was electrically driven, and was etching zinc, with rotating paddles, and the plate face downward. He had previously seen it running at the Printing Exhibition, and had ordered one, which had not been supplied.

Cross-examined by Mr. Astbury.—He could not remember a shelf as shown in fig. 1.

Mr. Walter.—Subject to being allowed to call a witness later, this is the plaintiff's case.

Third Day, July 8th.

Mr. Walter (by arrangement) called his further witness.

Mr. Ernest Walker Ashworth, sworn, said he was a member of the firm of Ashworth & Meredith, photo-engravers, whose chief work was high-class catalogue engraving. They knew and used the Levy machine, and carried out certain work for the plaintiffs from a negative sent to them for catalogue work. Their usual method was to paint out the background and air-brush the foreground, to get a record on a purely white ground. In this case the next thing was that they made a slight enlargement from the negative, on which the artists re-drew or re-touched. A half-tone negative was then made (produced) through a 175-line screen. The usual metal for high-class work was copper—certainly not zinc. Block produced and its mode of manufacture explained. It was etched in the

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* See advertisement. page i, in our last month's issue for a diagram of this machine.—Ed.

Levy machine in 140 seconds, with one etch only, and no hand-touching whatever. (Print from block handed in.) It was impossible to get such a result from that negative by tub-etching without fine-etching (Process explained in detail.) By this method it would take from forty-five minutes to an hour. The ability to deal with lights and shades and tints by the Levy method was a great advantage in actual practice. Small plates were easier to work than large. He did not think any engraver would use nitric acid for etching on copper.

Cross-examined by Mr. Astbury, reading from an article by Louis E. Levy in *Penrose's Annual* 1905-6.—Witness could not say when he first heard of the Levy machine in actual use in England—about two years ago. He did not know that much experiment had to be done before the machine worked properly. Nitric acid was very corrosive, but would not have corrosive effects on the metal parts of the machine if they were properly protected. He first bought an acid-blast machine six or eight months ago, before which he had been in business for some years doing catalogue and vignetted work. The block produced was an ordinary job going through the house. As compared with another print produced, his block (as it then stood) would not be saleable for high-class catalogue work: it was a commercial result for advertising purposes. The block was as deep as they turned out all their work.

He knew Mr. Peters but did not know Mr. Clark. Asked if he would agree with these gentlemen when they said the block was only half the depth necessary for commercial work, he answered as before. It was quite deep enough to get an electro from. It was shallower than another block handed up, because it was a finer screen.

Zinc and copper were essentially different metals. The zinc was softer, and the smallest of the dots were more liable to disappear on zinc than on copper. To get the same depth in a rocking bath as was produced in 140 seconds in the machine would take from five to ten minutes, but the result would not be so clean, because the high-lights would have a tendency to drop. Much higher skill would be needed to get the best possible result by bath etching. The bath would not give the same uniformity as the machine, with a large number of plates. It did not require a very competent man to work the Levy machine. There was no material percentage of spoils with either method when the men knew it. The reason why the machine was used for part and not for all of their work was because certain classes of drawings and photographs did not appeal to it. The machine was ill-adapted for very flat and faint originals. They had one Levy machine and three etchers, all of whom could use either bath or machine.

Re-examined by Mr. Gray.—For the flat originals it was necessary to make a flat negative and to practically draw and re-etch the image until all the tones were built up. The Levy machine was preferred for some work, but not for all. It was a great saving of time, and clean and deep.

Mr. JAMES SWINBURNE, sworn.

Examined by Mr. Astbury.—Said that, taking the body of plaintiffs' specification it seemed to him that the invention was blowing the acid on to an engraving plate by means of compressed air, the point being blowing violently a fine spray, and not the particular means of blowing it. The compressed air was to project the mordant in a fine spray on the plate, held so nearly horizontal that the acid would drop off in round drops instead of running to one edge. The patentee thinks that the mechanical dynamic force of the impact is something eating away the zinc, and that little globules shoot at the zinc and eat it mechanically.

To accelerate etching, distribution of the acid, and not force of impact, was the important thing. The impact was a very convenient way of local stirring. Pouring from a jug would probably give quicker etching than a gentle spray, but a violent spray on a plate held horizontally would probably be quicker. He did not know experimentally. If the plate were vertical in front of atomisers the acid would flow down and not come off in drops, and it was not the forcing with compressed air that caused the drops.

The Brooman patent used a common type of compressed air sprayer, of which many forms were known before the plaintiffs' patent. He did not know any atomiser in which there was not air or water pressure. It was difficult to say where an atomiser began and ended, but the pump and apparatus could not be considered part of it.

In the West patent there would be no spraying effect, but a simple shower, through holes at the top, on a plate laid at the bottom of the vessel. The plate would not be submerged, and its back would naturally be protected with varnish, because the acid would run around to the back. He had examined plates etched with spray thrown at various angles, and proofs from them, but could not see anything to show the direction of the spray in any case. He could not see that one side of the little pit was different from the other. He was not an etcher. He did not know why etching too long in a bath injured a plate, but it might be the result of the wave, from rocking unsymmetrically. With the method of West, and no wave effect, he thought there would be a perfectly even etch. Besides compressed air and nozzles, Levy suggested violent impact and the plate face downward, which he thought would be improvement over West's method. There was no difficulty in getting even distribution of acid by West's plan. He was sure that with ordinary-sized plates West would give as good results as Levy. Sand-blasting was generally done with the object face downward.

As a matter of fact, if a plate was not held horizontally there was little if any difference between the speed of etching at the lower end, over which all the acid flowed, and at the upper end, where only part flowed. Perhaps the thinner layer near the top allowed the spray to act more strongly, while the greater flow at the bottom stirred the liquid, one action balancing the other.

In re Truchelut, sand-blasting was a common practice before the date of the patent; and it was well known that some substances were suitable and others unsuitable for such treatment. The description of the increase of the solvent action of the chemical by the abrading action of the powder was like what we had heard from Levy. At that time engraving varied from the roughest to the finest. He did not think that Truchelut intended to use a great quantity of sand when he knew it would injure the thing, or very little liquid when the liquid was the primary thing. Perchloride of iron exposed to the air would become a slushy liquid; it was a common chemical at the time of the patent. He thought the patentee meant to put it through as a solution, but it would have no more abrasive action than an acid. It could not be ground up and used as a sand-blast. He did not know of any substances capable of abrading and etching at the same time.

The drawing was a mere diagram; one must have a nozzle or some means of distributing the spray evenly. With a square-ended tube the material would come out substantially along the line of the barrel.

Truchelut's idea was not only the same as Levy's but it had the same crudity of idea in thinking that the liquid acted as a mechanical abrasive. Nothing in Levy's machine was absent from Truchelut's except the mention of the face-downward position. Truchelut included all positions and did not select any.

The proof of plate etched by Mr. Ballantyne in his model of Truchelut, with one pipe, showed that the etching at the top and bottom of the plate were equal; the fault was the complete eating away of the part opposite the pipe. He did not think invention would be needed to induce anyone who found this result to move his plate further away from the pipe, or to give the plate motion so that the action would be distributed evenly. Considering the tint plates:—Anyone seeing the results would know where he had gone wrong and would have known that was not what the inventor meant. The result with the six jets was bad, because the experimenter blew the jets right at the plate without any uniformity, not carrying out Truchelut's direction that the stuff was to be finely distributed under great pressure.

The witness had not seen the Mark Smith machine, but had seen a model and a drawing of it. In working at 1700 or 1800 revolutions a minute, practically all the liquid that touched the paddles would be driven away, thrown off tangentially in all directions in drops of various sizes. The whole inside would be full of globules and splashes. The troughs would get their liquid mostly from what the paddles caught in the air, and would distribute it from the holes in streams which would break into drops. Going so fast, the paddles would keep a hollow in the liquid and each would act practically as a flat paddle. A plate laid nearly over the paddles would get the liquid practically vertically, while one laid further away would get it at various angles, causing a flow along the surface of the plate away from the paddle. The spray would not be nearly in such fine subdivision as in the plaintiffs' apparatus; in the plaintiffs' the whole would be very fine, while in this, part would be fine and part in large drops.

[ADJOURNED TO MONDAY, JULY 11.]

SUCCESS. — The men who have achieved success are the men who have worked, read, thought more than was absolutely necessary, who have not been content with knowledge sufficient for the present need, but who have sought additional knowledge and stored it away for the emergency reserve. It is the superfluous labor that equips a man for everything that counts most in life.—CUSHMANN K. DAVIS, in *The Printing Art.*

Photo-engraved Rollers for Mosaic Printing.

Reckard's Patent.

In this patent (No. 15,672 of 1910) Mr. Henry Lewis Reckard, of Hartford, Conn., states that his "invention relates to multi-color printing in non-overlapping colors known as mosaic, and has for its object to produce a photo-mechanical process of engraving several rollers so as to provide for the flow of the printing color in or on the fabric being printed so that adjacent colors will meet but not overlap or run into one another. As is well known, in multi-color printing provision has to be made for the flow of the printing color in or on the fabric being printed, and in order to provide for this flow, the intaglio printing surface is made slightly smaller than the area covered by the color in the printed fabric. My invention provides a method for producing this slightly smaller intaglio surface on each of the respective printing rollers in a manner which is accurate, speedy and inexpensive.

"Fig. 1 represents the original sketch of a three-color mosaic design; fig. 2 is an outline drawing of the areas covered by the several colors; fig. 3 is a negative of fig. 2, reduced; fig. 4 is a transfer made from a photo-lithograph produced from the negative of fig. 3, having the part of its surface which corresponds to all but one color in the original blotted out; fig. 5 has all but a second color, and fig. 6 has all but the third color blotted out; fig. 7 represents a negative of fig. 4; fig. 8 represents a photo-lithograph made from fig. 7; fig. 9 represents a transfer taken from fig. 8; fig. 10 represents a sheet of zinc to which the ink from fig. 9 has been transferred; fig. 11 represents the roller to be engraved being brought in rolling contact with fig. 10; fig. 12 shows a step in a modification of my process.

"Referring more particularly to the drawings, three colors, A, B, C and a blank space D (fig. 1), are represented in the design. Three rollers are therefore provided of exactly the same size, one for each color. I first make an outline drawing (fig. 2) of the three colors. The lines are of such width that the space provided by them in the subsequently engraved surfaces will be such as experience has shown to be necessary for the flow of contiguous colors. This space is well understood by those skilled in the art, and has long been allowed for in engraving of rollers for use in multi-color printing.

Fig. 1.

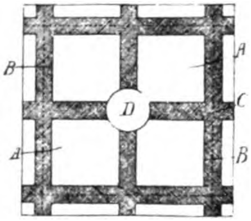


Fig. 2.

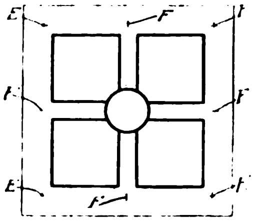


Fig. 3.

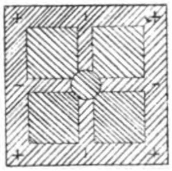


Fig. 4.

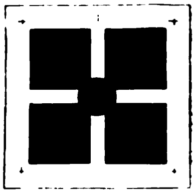


Fig. 5.

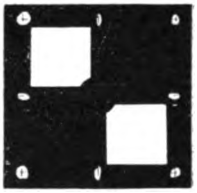


Fig. 6.

Fig. 7.

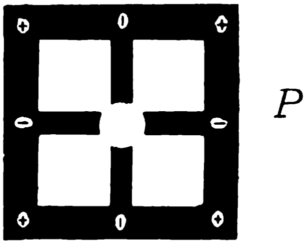


Fig. 8.

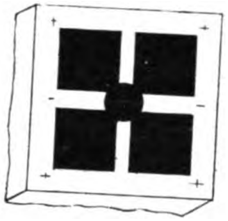


Fig. 9.

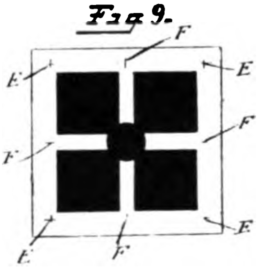


Fig. 10.

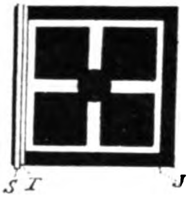


Fig. 11.

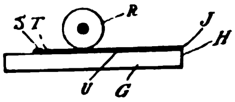
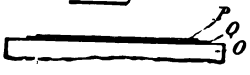
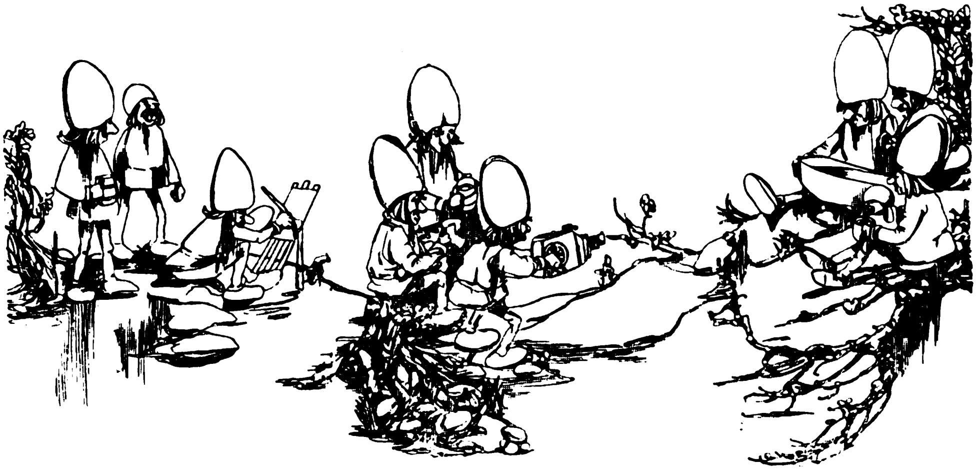


Fig. 12.



"I make from the drawings a negative (fig. 3) upon a sensitised plate, the space within the limits being made equal to the space to be occupied by the element on the engraved surface. I make from this a photo-lithograph and print therefrom on a smooth white card in dead black ink a number of copies, at least equal to the number of colors. I then fill in with dead black color on one card the white area of the original sketch and all but one of the color areas. On another I fill in the areas represented by all except a second color, and so forth. The result is three negative pictures, one of each of the areas of the several colors. The areas are proportional to the areas within the lines of the drawing, and are smaller than the corresponding areas would be if the design had been photographed without having first been outlined, the areas having been trimmed down by one-half of the width of the outline.

"Three negatives are then made. (The negative photograph P of the card of fig. 4 is shown as an example in fig. 7.) These negative photographs are each a positive photograph of the trimmed area covered by the respective colors in the design. Having obtained these photographs, a roller is made from each as described in my copending Patent No. 15,894 of 1909." [See opposite.—Ed.]



These gnomes represent the humorous ideas of the Manchester College of Technology students, on "process" in the olden times.

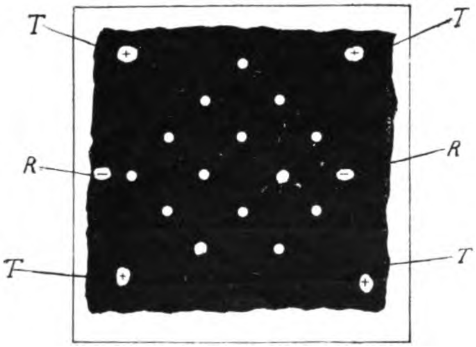
Photo-engraved Rollers.

Reckard's Patent.

Henry Lewis Reckard of Hartford, Conn., patents a process (British patent No. 15,894 of 1909, accepted July 7th, 1910) for photo-mechanical engraving, especially of roller surfaces. The complete specification is very lengthy, and from it we condense the following:—

" My invention aims to produce a simple, accurate, inexpensive and rapid method of engraving surfaces for intaglio or relief printing; to provide, when necessary, suitable 'grounds' upon the engraved surface; and to produce engraved surfaces having modulations of light and shade.

Fig. 1.



"The full process produces an engraved roller having a grounded intaglio printing surface in the form as required for printing fabrics such as cottons, silks, plushes, velvets, carpets, wall-papers and the thinner kinds of oilcloth. A modification produces surfaces for relief printing.

"Fig. 1 illustrates an original drawing of the design to be engraved. Fig. 2 is a negative of the same, somewhat reduced. Fig. 3 is a positive correspondingly reduced. Fig. 4 is a photo-lithograph from fig. 3. Fig. 5 represents a Ben Day or similar printing film. Fig. 6 represents the Ben Day film being applied to the litho. Fig. 7 shows the extension of the limit marks. Fig. 8 represents a lay-out of transfers. Fig. 9 represents a sheet of zinc or the like to which the transfers have been applied. Fig. 10 represents a sheet prepared to transfer to a roller to be etched to print repeats of the design of fig. 1. Fig. 11 represents a machine for printing the design on a roller.

" Fig. 1 represents a drawing which has limit marks T. In carrying out my process the distance covered by one revolution of the roller in printing is first ascertained.

"The original drawing is made upon paper, preferably white cardboard, considerably larger than the desired engraving. From the design a photographic negative, and from this a positive, is made upon a photographic plate. This positive must have its length between its limit marks T exactly equal to one of the number of equal parts into which the distance covered by one revolution of the roller has been divided.

Fig. 2.

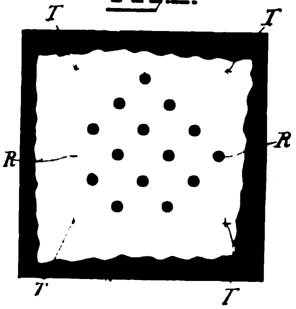


Fig. 3.

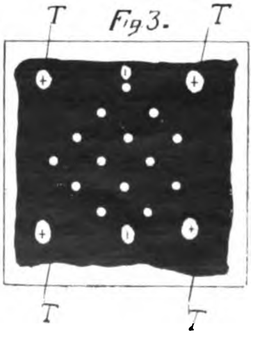


Fig. 4.

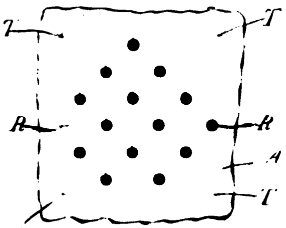


Fig. 5.

Fig. 6.

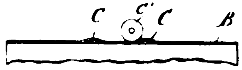


Fig. 7.

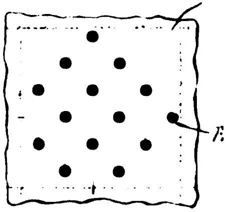
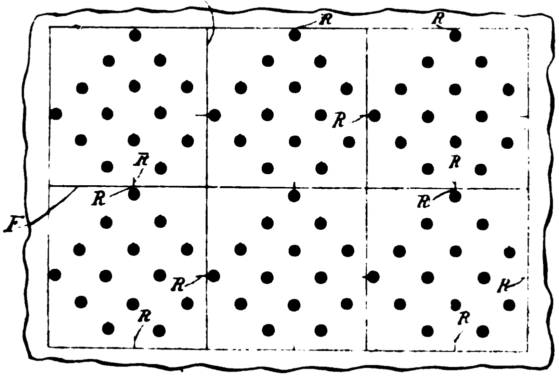


Fig. 8.



"The positive I shall hereafter term the 'photograph.' A lithographic stone or metal plate is prepared and sensitised and a photo-lithograph 'A' is produced from the photograph in the usual manner. This I term the 'photo-lithograph.' As is well known, the surfaces of this photo-lithograph which were exposed to the light take ink and print, while the surfaces which were not exposed will not take ink, and a transfer made from the photo-lithograph will have the black and white reversed from what they are in the photograph and the original sketch.

"In case the design is such that 'grounds' will have to be provided, I roll the photo-lithograph until the ink is built up to a thickness of, say, $\frac{1}{200}$ of an inch, as shown at C. I then take a flexible printing surface B provided with fine ridges or dots, such for instance as a 'Ben Day' film, and covering its projections with ink, lay the same over such portions of the photo-lithograph as it is desired to provide with a ground and press it thereon by means of a soft roller C' (fig. 6). The printing film is somewhat stiff, and its stiffness prevents the ridges or dots thereon from touching the depressed surfaces of the photo-lithograph close to the portions C where the ink is built up thereon. The large bare surfaces D therefore have printed thereon lines or dots corresponding to the projections on the flexible plate. These lines or dots do not extend clear to the edges of the heretofore bare surfaces, but stop short so as to leave clear lines between the ground and the built-up

Fig. 9.

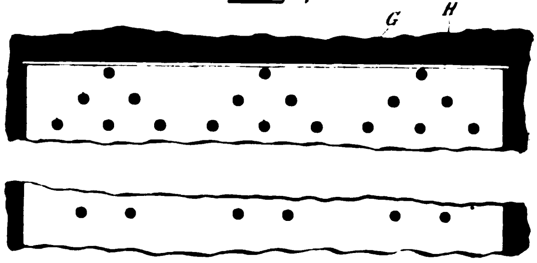


Fig. 10.

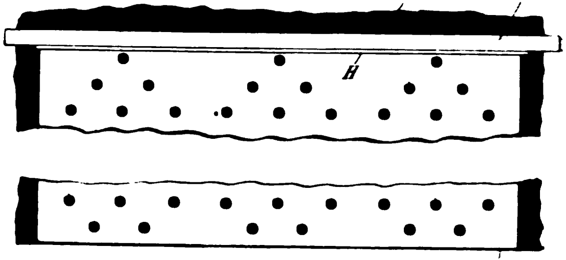
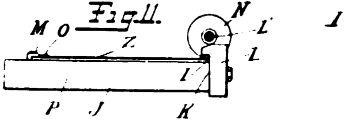


Fig. 11.



ink. The clear lines thus formed are necessary, it having long been known that in intaglio printing the grounds must not extend to the outlines of the design, since otherwise a rough and uneven edge will be produced. The 'Ben Day' film is preferably applied to the photo-lithograph, since it is then necessary to apply it to only one element of the design. It may, however, be applied at a later stage as hereafter explained. Of course, the photo-lithograph when the printing film is applied is dried so that it will take ink wherever contact is made.

"Having produced the photo-lithograph with the ground lines thereon, an accurate lay-out or development of the area covered by the roller in making one revolution is made on a smooth stiff card or metal plate faced with paper. This is divided into areas of exactly the size of the photograph. A number of transfers are then made from the photo-lithograph, cut to size and stuck up in the usual way, their edges abutting together as shown at F (fig. 8). The limit marks may be extended as shown in dotted lines in fig. 7.

"I transfer the ink of the transfers to a thin sheet of zinc G about $\frac{1}{100}$ of an inch in thickness, in the usual manner.

"The zinc sheet is rubbed up, slightly etched, and rolled up with an inking roller until the pattern becomes strong. If the grounds have not been applied to the photo-lithograph, the zinc plate may be rolled until the ink is built up thereon and the inked 'Ben Day' or other film applied to the zinc sheet.

"After the zinc plate has thus been prepared it is powdered with fine asphalt and dusted clean, then warmed until the asphalt is melted into the ink, forming a hard, smooth acid resist. The exposed edges and back of the plate are then coated with asphalt varnish, except a space H about $\frac{1}{16}$ of an inch wide at the beginning of the design, as shown in fig. 9. The plate is then immersed in dilute nitric acid (about sixteen parts water to one part nitric acid) until the exposed portions are eaten away to a depth of about $\frac{2}{1000}$ of an inch, so that it may be inked with an acid-resisting ink applied with a smooth inking roller. Etching must be of such depth that the inking roller will deposit no ink in the depths of the plate. The surface of the plate is a type surface and not a planographic surface. The design to be engraved upon the roller is in the depths of the plate.

"After etching, the resist and asphalt are washed off with turpentine and one edge is cut off on a line with the remote edge or end of the design, as shown at I at the bottom of fig. 10.

"The plate is then inked with a stiff acid-resisting ink and placed on the smooth table J of a transfer machine, as shown at Z (fig. 11). The plate is laid upon the table so that its cut edge I coincides exactly with the edge K of the table, and is secured in that position by clamps M. The roller N to be engraved is then supported above the table. A strip of thin clean paper O is placed on the zinc plate in a line parallel with the edge of the design about $\frac{1}{16}$ of an inch away from the design, so as to leave uncovered the etched line at the beginning of the design. The sticky ink holds the paper in place. The roller is then lowered on to the strip of paper (which is to provide a perfectly clean rest for the roller) and pressure applied. The roller is then caused to make one complete revolution over the surface of the inked plate, its axis being maintained parallel to the edge K and the edge of the plate which coincides therewith. The ink is thereby transferred to the surface of the roller, and if the lay-out is accurate there will be a perfect joint. The design shows on the roller in clean copper filled in with grounds, where grounds are used, the field around the design being covered with acid-resisting ink. The space H after etching is depressed and carries no ink, thus making the beginning of the design as printed on the roller clean and sharp. It assists in transferring the design, but does not appear on the roller.

"The roller is now powdered with fine asphalt powder applied with soft cotton and then dusted with a clean piece of cotton. The asphalt adheres to the inked parts but not to the clean copper. The roller is then warmed from the inside until the asphalt blends with the ink. When cooled it is immersed in a bath of acid, being rotated to ensure even etching. I prefer to use as an etching solution chloride of iron two parts, water one part, but nitric acid may be used.

"By the process above described, from a single sketch or element of the design, a pattern which will completely cover a roller of any given dimensions, both longitudinal and circumferential, and in such manner as to print a continuous pattern on fabric, can be quickly and cheaply made. The use of a zinc plate is particularly desirable, since it forms a permanent structure which does not warp or get out of shape and can be used repeatedly. Thus, if the roller becomes accidentally blurred during transfer the roller and zinc plate may be immediately washed and re-inked and the roller applied thereto a second time. Furthermore, the design can be preserved indefinitely thereon. Rollers are costly on account of the amount of copper therein, and a design is seldom kept upon a roller for any great length of time. The zinc of the plates, however, is not costly, and after the engraved zinc plate is once obtained, it can be used for printing any roller of proper size, and, if necessary, a roller of slightly larger size than the proper diameter can be worked down at any time to just the proper size for the use of any zinc plate. Manufacturers engaged in fabric printing and the like have a large variety of rollers of different sizes, and thus have on hand rollers which closely approximate any given size.

"If the original drawing is a negative of the design to be printed by the engraved roller, or the roller is to be a type face roller instead of an intaglio roller, the photographic negative of the original drawing is the necessary 'photograph' and the step represented by fig. 3 is omitted."

The inventor describes the necessary modifications for making his design in half-tone and in three-color, from originals requiring such treatment; and states as his first claim:—

"1. The process of photo-mechanically etching or engraving metal rollers, consisting in producing a photographic negative of the design to be engraved, producing therefrom a photograph the opaque portions of which correspond in form and dimensions to the parts of the metal surface to be removed from the roller, producing a photo-lithograph therefrom, producing a transfer from said photo-lithograph, transferring the ink from such transfer to a thin metal sheet, etching said sheet so as to remove the surface of the portions uncovered by said ink, applying ink to the raised portions of said etched metal sheet, printing said ink upon a metal roller and etching said metal roller so as to remove the surface of the portions uncovered by the ink printed thereon."

The Future of Photo-Engraving.

Address by S. H. Horgan, Editor, *Process Engraving*, in *The Inland Printer*, Chicago. Delivered before the International Association of Photo-Engravers, in convention at Buffalo, N.Y.

(*Continued from p.* 180).

PROCESS PRODUCT WILL CHANGE.

The product of the process man will change greatly: there will be more and more color plates, and we would have a greater demand for them now if the pressman and the press builder were not stumbling-blocks. We should be making more tint blocks for two printings than we are now doing. Combinations of line and half-tone give most effective results—I mean by that, line key blocks added to half-tone prints just as we now do the fourth plate in color printing. Line engraving will return to greater popularity when the engraver treats it with the respect which is its due, and in a business-like way increases the now absurdly low charge for engraving it.

Should I not make myself clear I will be glad to try and answer questions later, though it is to be hoped without results that occurred on another occasion.

Michael Davitt had just finished a rousing address to Ireland's sympathisers, when the chairman of the meeting asked: "Is there any gentleman in the hall would like to ask a question of the Hon. Michael Davitt?" From the rear of the hall came in a husky voice: "Yis, mister chairman, oi'd loike to ask a question of Mister Davitt."

Then almost a riot started around the questioner. Several men tried to reach him at the same time while he fought for his rights. Finally they got him through the door, and above the din sounds of the unfortunate being bounced down the stairs could be heard.

When quiet was once more restored the chairman coolly asked: "Is there any other gentleman would like to ask a question of the Hon. Michael Davitt?"

OFFSET PRESS AND ROTARY PHOTOGRAVURE.

The offset press will revive photo-lithography and will do work that was previously done by lithography before relief blocks ursurped its place. It furnishes the method of reproducing pencil and crayon drawings, and supplies all the beautiful effects of lithography at much reduced cost for press work and on rough, pleasing surfaced paper. It will not give the brilliancy in color of relief printing, though frequently a reduction of brilliancy would be a movement towards better taste.

Rotary photogravure, or intaglio printing from engraved rolls, is the process of great promise just now. It is capable, in proper hands, of giving us the finest art reproductions possible from the printing press. It has its limitations which will prevent it from interfering with relief and planograph printing. But it also has its charming field into which other processes cannot enter. Let us hope it will not be vulgarised by becoming too cheap and its results unworthy of it. It is sure to bring a more delicate art treatment into the production of wall paper and into calico and other fabric printing. It will supply an artistic substitute for the Sunday newspapers' present colored horror.

THE NATURE OF OUR ORIGINALS.

Just a word as to the character of the copy we accept from our customers. It will be better when we deserve it. It is too often the case now that an artist or publisher will say: "It does not make any difference what kind of copy I turn into the process man; he manages it all right." If we will be more honest with ourselves and the copy—what I mean is, if we will insist more on the photographer "getting it in the negative" and not leave the finisher to interpret or translate the copy according to his skill and the accidents of re-etching; if we will make it a rule to reproduce the copy, not what we think should have been the copy, then the customer will assume the expense and responsibility of having the copy in perfect condition before he submits it to us for our regeneration instead of reproduction.

HALF-TONE MAY FAIL, AS WOOD ENGRAVING DID.

In our half-tone work we should keep before us the lesson of one of the causes which brought on the self-destruction of wood engraving. When the golden age of wood engraving had been reached in this country the engravers began to vie with one another in the fineness of the white lines they would cut in the block, lines so faint and shallow in the shadows that the electrotyper could scarcely reproduce them in his plate, and which it was impossible for the pressman to keep from clogging with ink. Look out that we do not fall into the same error through the excessive fineness of the screens and the shallowness of the plates. There is growing evidence of it in the magazines of to-day, and consequent dissatisfaction from both publisher and public with the result.

It is in the character of the workmen that the future will bring the greatest change. Our business was an occupation destructive to health, to hands, to clothes, and to bank accounts. As it becomes cleaner, more healthful, physically and financially it will attract to it a more artistic type of workman—men, the product of technical schools as they are in Germany. Apprentices will know, at least, the elements of chemistry and optics, but, which is of more importance, will have their hands trained to drawing and their eyes to color perception. I have been asked whether it will become an occupation for women? I hope not. I feel about that as the Irish applewoman did, that Tom Daly, the poet-humorist of Philadelphia, tells about.

This woman had been peddling apples out of a basket for many years to the men on a Philadelphia newspaper. A woman was taken on the staff, but the old applewoman resented it, and she showed her disapproval of a woman reporter by keeping away from her.

One day the newspaper woman asked if she might have an apple, and offered a dollar bill to pay for it. And this was the dialogue that followed. The applewoman said: "Ah, never moind, ma'm, payin'. I have no change and you have an honest Irish face."

"I want you to understand, madam, I have not a drop of Irish blood in me. I am a Biddle."

"Ah, sure, I have a pedigree myself."

"Oh, yes; you will claim you are a descendent of an Irish king, I presume?"

"Ah, further back than that, ma'm; further back than that. Sure I'm a discindint of Ave, the first applewoman."

Gentlemen, the future of photo-engraving is in our hands. We must realise, first of all, how necessary process work is in the progress of civilisation and of business. Contemplate if you can the blow to enlightenment and trade should you all stop making cuts. Think of the weekly and monthly periodicals that would collapse immediately; the thousands of printers and pressmen, electrotypers, papermakers and allied tradesmen that would be out of employment, and the millions of dollars in presses that would go into the scrap heap. More serious than all this would be the blow to civilisation, for pictures, as you know, are a language more universal than Volapuk or Esperanto ever can be.

An understanding of our importance in the world's work will inculcate in us self-respect and a mutual regard for one another. The fellowship brought about by your organisation and through conventions like this one should prevent us from being played one against the other in the merciless grind of competition so that other lines of business may fatten upon us, and thus will the future bring us the reward our art industry deserves.

The "Say" Engraving Machine.

This machine, patented by Alfred Ernest Say and William Henry Say, of London, is described and illustrated by the following extracts from their patent:—

"The object of this invention is to construct apparatus or appliances affixable to a wood engraver's ruling or like machine, whereby the surface of any suitable substance can be engraved for printing purposes, by direct transmission from a photographic relief or from a mould of a photographic relief, or other prepared or shaped surface, whether produced by photography or otherwise.

Fig. 1.

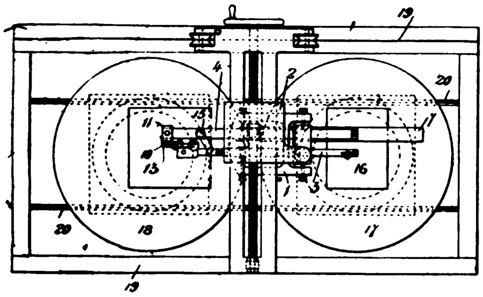
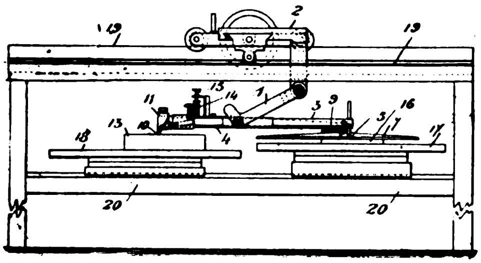


Fig. 2.



"Fig. 1 is a plan of the apparatus. Fig. 2 is a side elevation of same. Fig. 3 is a side elevation of the guide lever and plate, partly in section, the guide lever being attached to the frame, which is in section. Fig. 4 is a plan of the appliances. Fig. 5 is a side elevation of the graver lever and frame.

"We construct a frame 1, which we preferably pivotally suspend from the usual travelling tool carrier 2 of a ruling machine.

"To this frame 1 we connect two levers 3, 4, arranged side by side and pivoted on separate pivots to the frame 1, with the pivots in the same axial line, as will be understood from fig. 4.

"To one end of one lever 3, termed a graver lever, we attach a tracer point 5 and the corresponding end of the other lever 4, termed a guide lever, an ordinary point or pin 6 or other means for connection of a plate 7. We prefer that a pin 6 is placed at an angle as shown, and enters an angled hole 8 in the plate 7 and is held to the plate 7 by a spring 9 as in fig. 3.

"On the other corresponding ends we attach by any suitable means to the graver lever 3 a graver or cutting tool 10, and to the guide lever 4 an adjustable screw or socket 11, having a smooth end 12, or a disc or the like attached thereto, so that it rests upon the block or plate 13 to be engraved without injuring the surface.

Fig. 3.

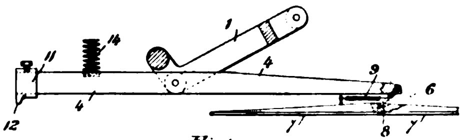


Fig. 4.

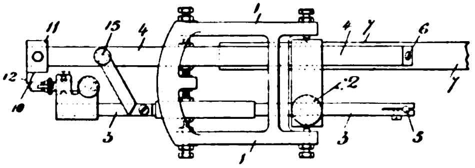
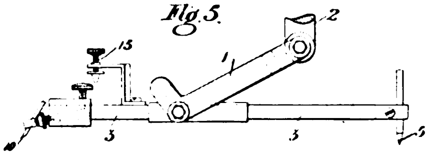


Fig. 5.



"On the guide lever 4 we attach a spring 14, and on the graver lever 3 we connect a screw rod 15 which has action on the spring 14 on the guide lever 4 to prevent the cutting tool 10 digging too far into the surface of the block 13 to be engraved whilst at work.

"The strip of plate 7 having a smooth surface, rides over the surface of the relief or mould 16, and in such a manner as not to injure its surface, the lever 4 and plate 7 adjusting themselves to any angle with regard to each other.

"The mould or like 16 we fix to the table 17 of the machine, and immediately under the tracer point of graver lever 3 with the plate 7 of the guide lever 4 laying upon its surface. The wood block, metal plate, or other body 13, to be engraved, we fix to the table 18 of the machine immediately under the graver tool 10 of the graver lever 3, the two blocks or plates not necessarily being in parallel planes or the same plane.

"The tracer 5 is then positioned to commence the work at one side corner of the prepared surface on the mould 16, and the graver 10 in corresponding position on the surface 13 to be engraved. The adjusting screw 15 on the lever 3 is then positioned for the tracer 5 to touch the mould 16, and the graver tool 10 is positioned to be within cutting distance of the engraving surface, *i.e.* to just touch the surface to be engraved, when the tracer 5 is at the lowest depth on the mould or relief 16.

"Now by reciprocating the frame 1 and its carrier 2 along the usual track 19 of the machine, the graver 10 will cut into the surface 13 in accordance with the movements of the tracer 5 over the mould or negative 16, the depth being varied in accordance with the surface of the mould or negative 16, and during this reciprocating of the frame 1 and its carrier 2 the usual ratchet or other wheel is operated to move the frame sideways, so that at each movement forward, or in some cases forward and backwards, the surface is engraved or cut with one line, as is well known with engravers' ruling machines, the degree of side movement depending upon the amount of relief.

"The mould or negative 16 and the block 13 to be engraved may be fixed to revolving plates 17, 18 in the bed 20, so that they can be positioned to allow of line engraving of any direction.

"The positions of the pivots on the levers 3, 4 can be varied with those in the frame 1 to suit the depth of cut required in the surface of the block 13 or the amount of relief; that is to say, the pivots, although always in axial line, may be adjusted as to distances from the ends of the levers.

"The tracer 5 in moving over the mould surface 16 rocks the lever 3 about its pivots, and the engraver or cutting tool 10 is caused to vary its depth in the surface whilst cutting, and the cutting point being of V shape will remove a narrow or wider strip, and consequently will leave lines of the desired width, according to the depth of the cut and angle of the V tool; thus if the tracer 5 is moving over a higher position of the surface of the mould which represents a white or light tone surface on the picture, the graver 10 enters deeper into the surface 13 and cuts a broad groove, and in some cases will leave no lines for printing, and when the tracer 5 is moving over a deeper surface of the mould 16, the graver 10 will only lightly cut into the surface of the block 13 and in some cases effect no cut at all, so that we have the heavy lines or black portions of the pictures, the lines being varied according to the movement of the tracer 5.

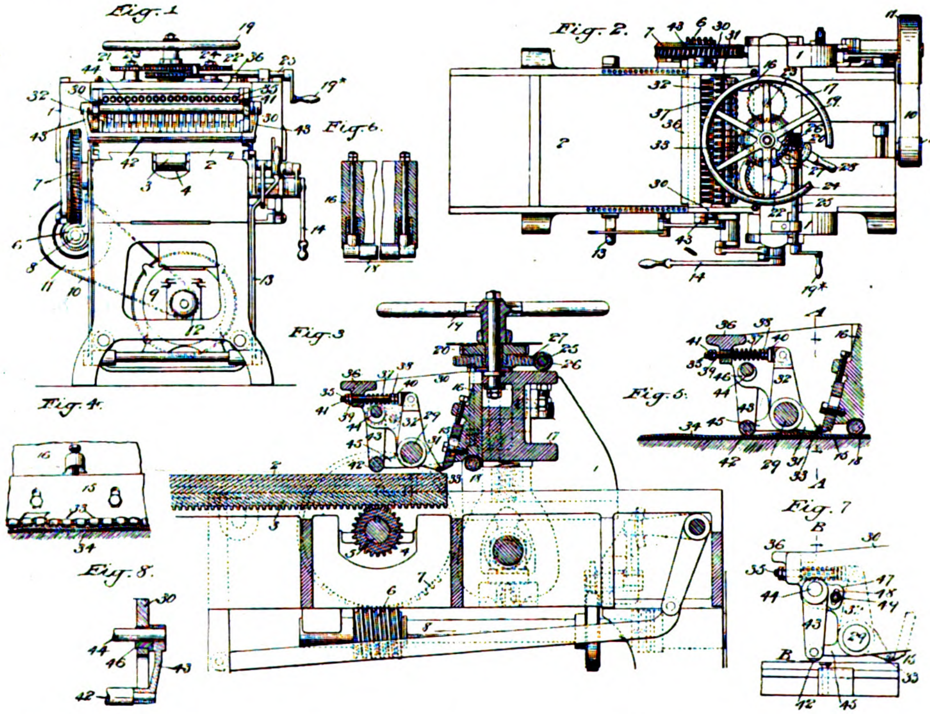
"To produce pictures or engravings from a relief where the lighter tones are represented by the greater depth of the relief, we reverse the positions of graver or cutting tool 10 and adjustable screw socket 11 and screw rod 15 and 14 respectively, so that we get the same movement with the graver as with the tracer instead of the reverse as in the previous case. In cases where the cutting takes place on both the forward and backward movement of the frame, we use a graver or cutter having a specially shaped or a double cutting edge, or it may be two gravers."

An Automatic Make-ready for Blocks.

A METHOD of avoiding the need of make-ready by causing the metal of the block to vary in thickness is patented by the C. B. Cottrell & Sons Company of New York (English Patent No. 25,894 of 1909). The claims are:—

"In the treatment of printing plates it has been found that greater relief in the blacker printing parts of the plate could be obtained if a greater quantity of metal could be stored on the back of the plate opposite the part needing the greater relief. This result has been obtained as follows:—

"A matrix is prepared so as to predetermine just what changes shall be made in the printing face of the plate to produce the desired result. The matrix is then placed face up upon the bed of a shaving machine with the printing plate face down thereupon in such position that the high and low portions of the matrix are in register with those portions of the plate which are to be made respectively low and elevated. The plate and matrix are then held firmly in position upon the bed of the shaving machine and the shaving knife is actuated either by moving the bed beneath the knife or by moving the knife along the bed, until the back of the plate is shaved to the desired thickness. When the plate is released, it will spring back to its normal position, leaving elevations and depressions along its back opposite to the depressions and elevations previously formed or produced in the matrix. The plate, while still in register with the matrix, may be subjected to heat and pressure to form permanently the desired depressions and elevations in the printing face of the plate.



"As the back of the printing plate is engaged by the shaving knife, the knife will tend to crowd the unsupported parts of the plate away from the edge of the knife, so that the metal will be removed from the back of the plate only at those portions opposite the high portions of the matrix.

"This present invention is directed to the process of treating printing plates consisting in subjecting the back of a plate to local pressure along the same in close proximity to the shaving knife as it is being subjected to its shaving operation, the said local pressure serving to assist the knife in crowding or forcing the metal away from the edge of the knife at the unsupported portions of the plate for leaving a greater thickness or storage of metal at such unsupported portions. Means for carrying out this process are represented in the accompanying drawings in which—

"Fig. 1 represents a printing plate shaving machine such as is described in the Specifications of Applications No. 25,872 and 25,869 of 1909, suitable for carrying out one step of the process.

"Fig. 2 is a top plan view of the machine.

"Fig. 3 is an enlarged detail longitudinal vertical section through the machine.

"Fig. 4 is an enlarged detail section taken in the plane of the line A-A of fig. 5.

"Fig. 5 is an enlarged detail vertical longitudinal section at the shaving knife and spring-pressed fingers, illustrating the action of the knife and fingers with respect to the back of the printing plate.

"Fig 6 is an enlarged transverse section of the inner spring-pressed plate-holding roller.

"Fig. 7 is an enlarged detail view, showing in side elevation the device for adjusting the plate cramping roller.

"Fig. 8 is an enlarged section taken in the plane of the line B-B of fig. 7.

"Fig. 9 is a transverse section through a matrix, face upward, with a printing plate ready to be placed upon it face downward.

"Fig. 10 is a transverse sectional view through the matrix and superposed plate upon the bed of the shaving machine, illustrating the shaving action of the knife of said machine.

"Fig. 11 is a transverse section of the plate face downward after the shaving operation.

"Fig. 12 is a transverse sectional view through the press board, the matrix, the soft paper sheet and the printing plate as placed together to be subjected to pressure and heat.

"Fig. 13 is a sectional view of the same parts shown in fig. 12, after they have been subjected to heat and pressure; and

"Fig. 14 is a section of the finished printing plate.

"In all of the views the thickness of the paper employed in the process and the scarcely visible greater or less prominence of the parts of the surface of the plates are somewhat exaggerated to render them distinguishable to the eye.

"The main frame of the shaving machine is denoted by 1 and its reciprocating bed by 2. The bed rack is denoted by 3 and is driven backward and forward by a reversing pinion 4 mounted on a shaft 5 driven by a worm and gear connection 6, 7 from a drive shaft 8, which shaft in turn is driven from any suitable source of power, such, for instance, as a reversing motor 9, by a belt and pulley connection 10, 11, 12.

Fig. 9.

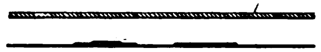


Fig. 10.

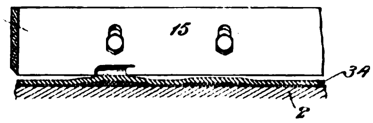


Fig. 11.

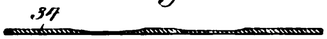


Fig. 12.

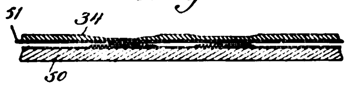


Fig. 13.

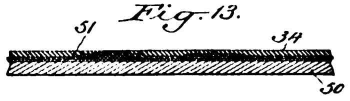
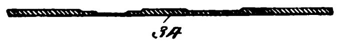


Fig. 14.



"The movement of the bed may be reversed automatically, and may also be reversed manually by the starting and reversing lever 13. The movement of the bed may also be controlled by the starting lever 13. The knife controlling lever is denoted by 14. These levers are suitably connected to the parts which they control, and as they form no part of the present invention, their operation will not be specifically described herein.

"The shaving knife is denoted by 15, and it is adjustably mounted on a member 16, which in turn is adjustably mounted upon the frame 17 adjustable in the main frame 1. The spring-pressed plate engaging roller 18 is mounted in the vertically adjustable knife carrying member 16. The vertical adjustments of the shaving knife 15 are controlled by a hand wheel 19 having a geared connection, 20, 21, 22, with the vertical adjusting screws 23, 24. A micrometer adjustment of the knife-carrying member 16 may be provided by a hand shaft 25 provided with a worm and gear connection 26, 27, with the shank of the handle 19*. This shaft 25 and its worm may be moved into and out of operative position by a hand lever 28.

"The means here shown for exerting pressure upon the plate locally along the same, in close proximity to the knife, is constructed, arranged, and operated as follows:—A plurality of spring-pressed fingers are mounted upon a cross-shaft 29 carried by brackets 30, forming a fixed part of the knife-carrying member 16. Each of these fingers comprises a downwardly and inwardly extended arm 31 and an upwardly extending arm 32. The arm 31 is provided with a barrelled roller 33 arranged to roll along the back of the printing plate 34 in close proximity to the shaving knife 15. A screw bolt 35 extends forwardly from the uprising arm 32 of each spring-pressed finger, which bolt passes through a cross-piece 36 of the brackets 30. A spring 37 is interposed between the cross-piece 36 and an adjusting nut 38 on the said screw-bolt. An adjusting nut 39 on the screw-bolt 35, in front of the cross-piece 36, serves to limit the inward movement of the arm 32 of the spring-pressed finger and thereby the downward movement of the arm 31. The tension of the spring 37 may be adjusted by the nut 38. These nuts 38, 39, may be provided with lock-nuts 40, 41, for locking the nuts 38, 39, in their adjusted position. A cramping roller 42 is carried by arms 43 supported upon a cross-shaft 44 mounted eccentrically in bushings 46 rotatably mounted in the brackets 30. Stops 45 on the brackets 30 limit the inward movement of the roller 42. This roller 42 serves to hold the printing plate and its interposed matrix firmly down upon the bed 2 of the machine as the plate is passed beneath the shaving knife 15.

"Means are provided for adjusting the cramping roller 42 toward and away from the bed 2, which means consist in the present instance of flanges 47 on the eccentric brushing 46, which flanges have elongated slots 28 through which clamping bolts 49 extend for securing the flanges rigidly to the brackets 30 at any desired position within the limits of their rotative movements.

"The press board shown in figs. 12 and 13 is denoted by 50, and the blotting paper which is interposed between the matrix and the plate is denoted by 51.

"In carrying out the process after the formation of the matrix in accordance with the tones of the subject, it is laid upon the bed 2 of the shaving machine with the built-up portions uppermost, and the printing plate to be affected thereby is then laid face down on said matrix and in proper register therewith. The back of the plate may then be subjected to the action of the shaving knife 15, for the purpose of producing in or on the back of the plate a series or set of depressions and elevations the reverse of those formed in the matrix by the built-up and cut-out portions of the latter, in order that the said depressions and elevations thus formed in the back of the plate may be subsequently produced or formed in the face of the plate by a succeeding step in the treatment, as will hereinafter appear.

"The plurality of independent spring-pressed fingers located adjacent in the knife will exert their pressure upon the back of the plate as it passes beneath the knife, thus serving to exert pressure locally along the plate and assist the knife in crowding the unsupported parts of the plate away from the edge of the knife for permitting portions of the plate opposite the raised portions of the matrix to be removed in one or more shavings by the knife. The shaving operation is continued until a full shaving is made covering the entire area of the back of the plate, or until the plate has been shaved to the thickness desired.

"The printing plate has a certain amount of resiliency, and hence when the various portions of the plate are deflected or pressed down during the shaving operation, such deflections are but temporary, and as soon as the pressure is removed such deflected portions spring back to their normal position. Therefore, it will be seen that when all of the several shaving operations are concluded, the face of the plate will be straight and even while the back of the plate will be uneven or irregular, and consists of depressions and elevations the reverse of those in the matrix, and it will be understood that such depressions and elevations in the back of the plate are those formed by the cutting process and as predetermined and controlled by the making-up or construction of the matrix.

"After the shaving operation just described, and while the matrix is still in register with the plate, the latter is subjected to the action of heat and pressure and the projections on the back of the plate are forced forward and similar projections forced into the hollows or depressions in the matrix at the face of the plate, and at the same time the back of the plate is pressed true or even, as represented in fig. 13.

"After this operation the plate and matrix are removed from the heating and pressing machine and placed in another press where there is no heat and which is preferably kept cool, and by means of pressure the face of the plate is positively and finally set to conform to the outlines of the matrix, and when removed from the last-mentioned press the plate will have the appearance represented in fig. 14, wherein it will be observed that the back of the plate is true or even, while its face, which constitutes the printing surface of the plate, is irregular or high and low at different places so as to have a varying pressure on the paper in the printing operation and thus yield varying strengths of impressions or heavy and light impressions on the surface of the paper and at the places predetermined by the making of the matrix from a proof or copy of the matter or subject which the plate to be treated bears.

"In so far as certain features of these improvements in the art of treating or manipulating the plates are concerned, it will be understood that we do not wish to be limited to each and all of the steps of the complete process to which we prefer to subject the plate, for some of such steps may be used without others or in connection with still other steps or modes of treatment to produce certain of the results produced by us and to avoid, either in all or in part, the work of underlaying or overlaying. We desire to cover herein not only the process as an entirety but also the steps or sub-processes thereof.

"What we claim is:—

"1. In the process of treating printing

plates, subjecting the back of the plate to the action of a shaving knife and exerting pressure locally upon the back of the plate along the same in close proximity to the knife, by suitable means, such, for instance, as a plurality of independent pressure devices.

"2. In the process of treating printing plates, applying a matrix to the face of the plate, subjecting the back of the plate to the action of a shaving knife, and exerting pressure locally upon the back of the plate along the same in close proximity to the knife by suitable means, such, for instance, as a plurality of independent pressure devices.

"3. A process according to Claim 2 in which the plate and matrix are subjected to heat and pressure to form permanently the desired depressions and elevations in the face of the plate.

"4. A process according to Claim 2 in which the matrix is provided with high and low portions corresponding respectively to the depressions and elevations which are to appear in the face of the printing plate, and in which the local pressure upon the back of the plate in close proximity to the shaving knife assists the knife in forcing the unsupported parts of the plate away from the edge of the knife during the shaving action."

More Notes on Cost and Selling-Price.

MR. GEORGE H. BENEDICT has returned to his old subject with renewed energy, and gives the following facts and deductions:—

Eleven cents (5½d.) per square inch will cover the cost of twenty-five inch cuts.

Twelve cents (6d.) per square inch will cover the cost of twenty-inch cuts.

Fourteen cents (7d.) per square inch will cover the cost of fifteen-inch cuts, and

Seventeen and one-half cents (8¾d.) per square inch will just cover the cost of ten-inch cuts.

My records further show that over fifty per cent. of the cuts and forty per cent. of the square inches of half-tone we turn out are minimums, *i.e.* cuts of ten square inches or less. I am firmly convinced that in billing our half-tones at fifteen cents (7½d.) per square inch we lose money on every half-tone we deliver for less than one dollar and seventy-five cents (7s. 6d.). The mere fact that local organisations have never been a success is an evidence that something has prevented the trade from getting together and sticking together.

The fault cannot be laid to the lack of a market, for there is always a need for illustrations; nor to the inability of those for whom the cuts are made to pay a fair price for them, for the wealthiest industries are the engravers' customers.

Then let us consider the peculiarities of photo-engraving and see if it is not possible to locate its fundamental defects, and by applying the first principles of good business, overcome its troubles.

As I see it, the prevailing conditions are brought about by the following unusual features of the business:—

1. Everything we turn out is made to order.

2. We name the price before we get the order—frequently without seeing the copy.

3. We deliver the goods at the price

quoted and never know what they have cost us.

4. We are under a continual expense and must have orders. Because — to keep all hands busy is almost as important as the price we get for the work.

5. We are in a one-day business and seldom have enough work on hand to keep the plant going forty-eight hours. This is true notwithstanding we all have regular customers whose work runs nearly the same from month to month.

6. The most we know of cost is the favorable or unfavorable difference between the sales and the expense accounts. But we do know that the difference is usually favorable when we are busy and unfavorable when we are slack.

7. We also know that at times when we have been busy we have found a disappointing balance. We find in such cases the work has run to small sizes.

8. We have been agreeably surprised at times to find an unexpected profit in the output for a month of ordinary endeavor. We find in such months the work has averaged large.

9. We are not merchants, because we do not buy at a price and sell at a better price. We are not manufacturers, because we have nothing on our shelves to prove that we are, and we don't like the title. We are not professional men, because we charge nothing for our knowledge. We are none of these because we are something else, and I take it that our best claim would be that we are contractors.

10. We hire artisans or craftsmen by the week and sell their services in the job. We must keep them busy or we lose money. We ask no remuneration for our knowledge, and our hope is to make a little margin on the labor of each employee.

11. The employee has the ethics of a professional man and will not work unless he gets his price. We grant him his price and speculate on selling his product at a price set by competition; often the competition is reckless, if not malignant.

12. We, as contractors, have no professional ethics. We grant "the laborer is worthy of his hire," but we that hire the artisans are more concerned about keeping him busy than we are about the cost of the article which he and his fellow-workers produce.

13. The trouble, then, with the engraving business is that we do not know the cost of the articles we contract to make; as a consequence we sell the goods without regard to cost — sometimes at a loss; therefore there is no stability in the business.

The Lithographic Artists' and Process Workers' Quarterly.

THIS new organ of the London branch of the Lithographers' and Process Union is a welcome addition to the trade press, and should be a subject of congratulation to Mr. F. C. Tolhurst. Its annual subscription is 8d., including postage, from the office, 65 Farringdon Street, London, E.C. In the first issue Mr. C. Harrap writes on "The Artists' Aspect of the 1910 Printing Exhibition," and begins a serial article on "Lithography: its Origin and Development"; Mr. A. J. Newton begins a serial on "The Evolution of Photo-mechanical Illustration"; and there are articles or notes on "The Thames Color Plate," the "Bowerman Election Fund," "Notes from the International Bulletin," "Notes from the Executive Council's Minutes," etc. A few advertisements of interest to the trade are included.

The Process Convention.

THE Convention of the I.A.P.E. brought a great gathering of keenly interested members to Buffalo, where three days were spent in reading and hearing papers, in discussing the problems raised, and in enjoying the attractive diversions arranged by the national Entertainment Committee and the local Ladies' Committee.

The Association seems to be "making good." Before the Convention it had a hundred and ten firms in membership, and eight more joined during the first day of the meeting. Satisfaction with the past year's management is evidenced by the re-election of all the officers, viz.:—*President*, H. C. C. Stiles, Washington, D.C.; *Vice-President*, Thomas Heath, Buffalo, N.Y.; *Secretary*, George Brigden, Toronto, Canada; and *Treasurer*, John C. Bragdon, Pittsburg, Pa.

One of the best features of the meeting was the evidence of increased confidence and decreased friction between employers and employed; and there was strong argument in favor of amalgamation of working agreement between I.A.P.E. and the "open shop" association, some of whose members were present as delegates.

Apprenticeship, Cost-keeping, Creating New Business, Offset-Litho Work, Co-operative Fire Insurance, and Saving Silver Wastes, were the subjects of discussion, and mighty tough nuts a few of them were found to be.

Sauce for the Goose is—

PRINTERS GIVE THE PROCESS MEN "A FRIENDLY LEAD."

THE members of the Ben Franklin Club of Chicago have decided that the cost of printing has grown so much as to necessitate an increase in selling price. They have therefore issued the following manifesto, to be used by printers as a notification for their customers. We commend this example to process engravers.

BEN FRANKLIN CLUB, CHICAGO.
Telephone Harrison 3688.
1327 Monadnock Building.

SUBJECT.—Increased Cost of Printing—Read—and Refer to the Man Who Buys Your Printing.

John Smith Manufacturing Co.,
Chicago.

Dear Sir,—In common with other industries the cost of manufacturing printing has steadily advanced during recent years. During the past two years operating expenses have sharply advanced, working hours have been shortened and wages increased. The manufacturing printer has heretofore borne this burden, which should have come upon the consumer.

It is evident that the employing printer must increase his prices or go out of business. The most recent increase in the cost to the employing printer came on October 1, when the Typographical Union advanced the price to be paid their men approximately 10 per cent., which was a compromise effected after several sessions with the committees of employing printers.

The Ben Franklin Club of Chicago is an association of employing printers organised for the purpose of determining manufacturing cost as applied to the printing arts, whereby a just price may be made to the public and a just return of profit accrue to the printer. The Ben Franklin Club has not nor does it propose to establish prices for printing.

Representation, however, has been made to the Club that users of printing are not generally conversant with the upward trend in the expenses of printing, and are prone to consider any advance in price as coming wholly on the initiative of the printer with whom they are doing business.

It has been decided by the printers of Chicago that an increase in the price for printing is necessary, and that the new rates shall go into effect immediately, approximating an average of 15 per cent.

The Ben Franklin Club of Chicago therefore takes this means of notifying the users of printing that the increase in price is the result of conditions general in the trade, and that an advance of price is concurred in as fair and reasonable by the printers of Chicago.—The Ben Franklin Club of Chicago.

Specimens and so forth.

The American Steel and Copper Plate Company uses three-color one-month wall calendars for its advertising, and very effective they are.

We want you to send us an occasional little batch of proofs of your latest and most interesting work. Or a specimen-book or other trade-attractor, when you issue one. Why not put us on your regular mailing list for such things?

Charles W. Harness has always refuted the idea that the "shoemaker's wife always goes worst shod," for his advertising has been admirably designed and executed. Since developing into the Engraving Co., Ltd., Mr. Harness has lost none of his love for fine announcements, and one of the most attractive simple circulars we have is that wherein his Company "claim that there are no blocks made which excel ours in definition, depth of etching, and careful finish."

Terminological inexactitudes and many sly slaps at competitors and others are served up in a booklet by D. Velop Herr, issued by the Arthur Cox Company under the title of "A Day at the Printing Trades Exhibition." It makes interesting reading for those who are in the trade and who will understand some of its rather recondite references, but its general effect is to suggest that most blockmakers and many printing-machine manufacturers are liars, and we do not feel quite sure that it is the best possible way of giving a good impression of the firm by which it is issued.

Sanmarti y Ca. of Lima, Peru, are readers from whom we are always glad to hear, because they are doing good progressive pioneer work. Their latest advertisement takes the form of a well-arranged booklet, with dark-brown cover printed in black and embossed on gold, containing a brief history of the firm, portrait of the founder, and twenty-seven half-tone views of various departments in their business, as well as insert specimens of their work. The specimens include capital three-color, a good color line-job advertising their specialisation in posters, and a page reducing a great number of specimen pages of catalogues produced for their customers.

Offset Litho, which seems to have lagged behind the American practice in English hands, is being used every month with more success and for finer work. Amongst the firms who are developing it most successfully are Messrs. Blades, East & Blades, from whom we have seen some very promising half-tone plates from photographic originals, and W. W. Sprague & Co., who have recently done some very fine engraving-like prints for the dignified advertising of James Buchanan & Co.'s Scotch whiskies. Probably the explanation of the delay in developing fine half-tone work in Britain is in the fact that the firms and machines have been day-and-night busy on general work and have had little temptation to experiment.

School Notes.

The Bolt Court School has been removed to temporary premises in Fleet Lane, Farringdon Street (close to Ludgate Circus, and alongside the Memorial Hall) during the building of new premises on the old site. The new session opens September 19th, with day classes from 10 a.m. to 1 p.m. and 2 p.m. to 5 p.m. every day except Saturday and Sunday, and with the following excellent synopsis of evening work:—

Photography for Reproduction Processes.—The Preparation of Originals for Reproduction: F. W. Brookman. Mondays and Thursdays, 7-9 30 p.m.

Negative-making Classes.—The Principal, A. J. Bull, W. J. Smith and A. Anning. Line and Continuous Tone. — Beginners: Tuesdays, from 6 to 8 p.m., or 8 to 10 p.m. Line and Continuous Tone.—Advanced: Wednesdays, 7-9.30 p.m.

Technical Photography for Catalogue and Book Illustrations.—The Wednesday evening class during the summer term will meet as well every Saturday afternoon in order to give students practice in the use of daylight for outdoor and indoor photography. Wednesdays from 7 to 9.30; Saturdays from 2.30 to 5.

Screen Negative-making.—Mondays from 7-9.30 p.m.

Tri-Color Block-making. — Thursdays or Fridays, 7-9.30 p.m.

PROCESSES FOR RELIEF PRINTING.—Line Blocks on Zinc, Brass and Copper: F. Lamb. Mondays, from 7-9.30 p.m., or Fridays, 7-9.30 p.m.

Tone Blocks on Zinc, Brass and Copper: J. Gill. Tuesdays or Thursdays, from 7-9.30 p.m.

Fine Etching: J. M. Johnstone. Wednesdays or Thursdays, from 7-9.30 p.m.

Mounting Process Blocks: H. T. Williams. Mondays and Fridays, 7-9.30 p.m.

Proving Letterpress Blocks: B. A. Newton. Tuesdays and Thursdays, 7-9.30 p.m.

PROCESSES FOR SURFACE PRINTING.—Lithography, General: R. W. Baxter. Tuesdays and Thursdays, 7-9.30 p.m.

Lithography.—Map and Plan Drawing, Lettering and Transfer Writing: Geo. Howard. Mondays and Wednesdays, 7-9.30 p.m.

Collotype and Photo-lithography: W. J. Smith. Mondays, 7-9.30 p.m.

INTAGLIO PRINTING PROCESSES. — Photogravure: J. Threlfall. Tuesdays or Thursdays, 7-9.30 p.m.

Mezzotint Engraving and Etching: W. Seymour. Mondays, Wednesdays and Thursdays, 7-9.30 p.m.

DRAWING CLASSES.—Life Class. Drawing and printing from the figure: Walter Bayes. Tuesdays and Thursdays, from 7-9.30 p.m.

Costume Class.—Drawing and painting from the costume model: Walter Bayes, assisted by W. Gulzow. Mondays, Wednesdays and Fridays, from 7-9.30 p.m.

Color Classes.—Drawing and painting from natural forms. Class I. Saturdays, from 2-4.30 p.m.: Walter Bayes. Class II. Tuesdays, from 7-9.30 p.m.: W. Gulzow.

Design Class: A. A. Turbayne. Wednesdays and Fridays, 7-9 p.m.

Pictorial and Decorative Composition: W. Seymour. Mondays and Thursdays, 7-9.30 p.m.

Antique Drawing Class: W. Gulzow, assisted by T. P. Mullins. Drawing from the antique and casts from life. Wednesdays and Fridays, from 7-9.30 p.m.

Elementary Drawing Class: Miss C. L. Allport. Tuesdays and Thursdays, 7-9.30 p.m.

LECTURE COURSES.—1. Elementary Chemistry and Physics in relation to Photo-Engraving and Lithography. 2. Paper-making. 3. Stationery Manufacture.

HONORS IN THE CITY AND GUILDS EXAMINATIONS.—Seven students of the Manchester Municipal School of Technology have done well in these exams., for the list just issued includes:—Barton, William, Engraving for Calico Printers: 1st honors, £3 and silver medal; Cuffwright, Thos., Lithography: 1st honors, £2 and silver medal; Gilbert, Geo., Photography (Photo-mechanical): 2nd ordinary, £1 and bronze medal; Haworth, Rose L., Bookbinding (forwarding): 2nd ordinary, £1 and bronze medal; Sahasrabudhe, Shankar B., Photography (Photo-mechanical): 1st ordinary, £1 10s. and bronze medal; Thomas, Adolph, Photography (pure): 1st honors, £2 and silver medal; Watkinson, Joseph W., Photography (pure): 2nd ordinary, equal 10s., and bronze medal.

Publications.

"LEXIKON FÜR PHOTOGRAPHIE UND REPRODUKTIONSTECHNIK," by Professor E. H. Emmerich. Second section, price 6k. or 5 marks (Vienna: A. Hartleben's Verlag, Seilerstätte 19).—The first part of this lexicon was noticed at some length in our July issue (p. 162), hence it is now only necessary to mention the publication of the second part.

"ZINCOLOGY," a booklet of hints, suggestions, and formulæ for offset-litho printers, has just been published, without charge, by the Ault and Wiborg Co. of St. John's Square, London, E.C. The thorough way in which this company has gone into the manufacture and supply of zinc plates and "offset" necessaries is an indication of the great importance of the offset methods. The little book should be owned by all our readers who are interested in litho.

"THE PHOTOGRAPHY OF COLOR CONTRASTS" is an outcome of the technical research laboratory established some eighteen months ago by the Cramer Dry Plate Company under Mr. R. James Wallace, who is the author of the little work. It will prove useful to anyone photographing colors and wishing to know how to emphasise any one color at the expense of another. It gives some idea of how certain of the Cramer plates and light-filters have been matched and co-related, and its perusal is just as important to the reproducer who works in monochrome as to him who does three-color reproduction.

Metzograph —The booklet under this title, which we briefly mentioned in a recent issue, deals with Wheeler's patent metzograph grained screen and its application to block-making, photo-litho, and photogravure. It has many examples of work made with the screen in various grains from No. 00 to No. 8; but its most useful matter is the technical instruction on the use of the screens, with illustrated hints on the development of metzograph negatives, etc. The writer says, very truly :—"It is a matter for regret that the results which are sometimes shown as the work of the screen are not of good quality, and this is probably due to the fact that the operators have not realised the slight differences in procedure which are necessary when using the metzograph screen as against the ruled screen." The booklet is intended to correct this difficulty, and should lead to more general appreciation of what is a real aid to the process man. The booklet is free from Penrose & Co., Ltd., Farringdon Road, London, E.C.

The twenty-fifth anniversary of *The American Printer* is surely a time for congratulation, since the publication shows all the signs of success and prosperity. Its anniversary issue is a magnificent piece of magazine-making. Its principal contents are articles reminiscent of the various departments of printerdom during the past quarter-century, written by men who have taken a lead in making history. Very appropriately, the section "Engraving" is treated by Stephen H. Horgan, a man who has been personally connected with a larger number of beginnings of success than, possibly, any other man in the craft. He has also conducted more than one bold experiment that has ended in a glorious failure, but, like most good pioneers, has lived to see other men reap big results from the seed he sowed. The whole progress of photo-engraving has been marked by many such cases—notably F. E. Ives, who did so much to establish both half-tone and trichromy on practical lines, and William Kurtz, who sank a fortune in attempting to make a commercial success of three-color. These are mentioned by Mr. Horgan, and they may be matched by many similar cases on our own side of the water, from Henry Fox Talbot with his early photogravure, Woodbury and Smith with the Woodburytype and a host of kindred processes, and David Winstanley, a real martyr of invention, to the many men who, even in the last ten or fifteen years, have sacrificed time, money, health, and sometimes life itself, in the effort to introduce an improved process.

In the departments other than "process" are some notes of interest to our own craft, as, for instance, under "Press-work," where Mr. Henry Lewis Bullen relates that Henry Barth of Cincinnati made the first rubber offset presses, which were running successfully, printing flags by the million, some years before Rubel introduced his rubber offset press and began to arouse general interest in the method.

Brevities.

Self-printing plates is a name used for cuts provided with an automatic make-ready overlay.

Lead-wax matrices should be investigated with care by everyone who does, or wishes to do, electrotyping from fine originals. All particulars from Hunters, Ltd., Poppin's Court, Fleet Street, London, E.C.

The Mark Smith Etching Machine will hereafter be permanently on exhibit at the show-rooms of Hunters, Ltd., Poppin's Court, E.C., and will be demonstrated to any of our readers who may call. If by appointment, so much the better.

Sir Benjamin Stone, the indefatigable photographic recorder, has made a large series of pictures of the Japan-British Exhibition. If all his treasures could be unlocked, what a number of interesting books could be made, and what a lot of work for the process men!

The process plant of George Newnes, Ltd., was examined with much interest by the party of German printers (some fifty in number) who were the guests of the Master Printers' Association for five days recently. They visited the Newnes plant on Wednesday, August 17, the last day of their stay in this country.

The Liquid Litho Drawing Ink of Hunters, Ltd., is not only good for its original purpose, but is also very suitable for touching-up and adding work to line-engravings direct on the zinc. It is quite insoluble in water and stands the etching-bath. It is always ready for use, flows easily, and can be applied by spray or air-brush quite satisfactorily.

A NEW STEREOTYPING PROCESS patented by Hjalmar Carlsen, of Raadhuspladsen, Copenhagen (Brit. patent 14,971 of 1909) moulds in lead which has been heated almost to melting-point, from a block which is heated to a greater temperature than the lead; and from this lead matrix produces printing blocks of hard celluloid, ebonite, or similar material.

MR. J. CLYDE OSWALD, editor of *The American Printer*, is at present in Europe, looking into the latest developments of printing on this side of the water, and taking rest at the same time. He regards photo-engraving as a most important branch of the printing craft, and takes much interest in offset-litho and machine-printed photogravure.

THE UNITED STATES BUREAU of Engraving and Printing has recently turned inventor on a well-planned scale, and has devised machinery that introduces great saving of labor. This does not belong to the engraving side, but to printing, numbering, counting, perforating, etc. In process work, however, the U.S. is an investigator through more than one of its departments, particularly through the photographic, photo-mechanical and printing department of the Geological Survey.

"FAKE" PICTURES.—Two cases of much interest to illustrators occurred during July. *The Daily Express, Ltd.*, sued Reinhold Thiele & Co. for £100 damages for fraudulently representing that a certain picture represented "preparations for the lying in state at Westminster Hall." The defendants said that they had a picture of the preparations for the late W. E. Gladstone's lying in state, and sent it around the press when preparations were being made for the lying in state of King Edward. There was no intention to deceive.

The same paper sued Montague, Dixon & Co. for £100 damages for supplying what purported to be a photogram of the arrival of M. de Lesseps at Dover in his flying machine, but which was a made-up picture. Defendants contended that the picture was not a "fake," and that there was no intent to deceive.

In both cases judgments were given for the defendants, with costs.

THE MACHINE CAMERA AND STAND (Linley's patent), of which all rights were recently acquired by Hunters, Ltd., from the Camera Construction Company, has been the subject of certain improvements.

A connection has been made between the front body and the copy-board so that the two work in conjunction. If the front body is racked out, the copy-board automatically travels on its supports in the same direction so as to keep the copy always in line with the lens. This attachment can be thrown out of gear immediately if necessary.

Another improvement is a glass copy-board (patent applied for). The copy is held to the glass copy-board by means of suction bulbs and spring clips which are immediately fixed and instantaneously detachable. One of these improved machine cameras has just been built for the Grout Engraving Company, another for Brisbane, and one for Messrs. Bemrose & Sons, Derby.

PHOTOGRAPHY FOR THE WOOD-ENGRAVER.—Dr. Mebes, writing to *The British Journal of Photography* recently, said:—"Allow me to tell you the trade secret as I have learned it from a professional who did nearly all the work for the wood-engravers of Berlin: One hundred and sixty grains of ammonium chloride, dissolved in one ounce of water, are added to two ounces of the whites of fresh eggs, beaten to a froth, filtered after twenty-four hours, and some barium sulphate added. This mixture is brushed very thinly on the wood-block and dried. The color of the wood can be faintly seen through this coating. These blocks are prepared in advance, and for use sensitised in a solution of sixty grains silver nitrate in one ounce of distilled water. The blocks are dipped or floated on the silver bath for some minutes and dried in the dark. When dry they are printed under a reversed negative. The time of exposure can best be found by experiment. After printing, the block is dipped in a combined toning and fixing bath, then washed under the tap and dried. It is important that the wood be subjected to as little water as possible, to prevent its swelling and cracking on drying." The barium sulphate is used merely to give a white surface to the wood, so that its amount is unimportant. It should give a good background for the shadows of the print and yet should not be thick enough to hide the grain of the wood entirely, or to chip under the graver. The printing should be done in a hinged registering frame; then the progress can be watched from time to time and the depth of printing be chosen to suit the engraver.

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"The Process
Photogram."

THE PROCESS
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THE PROCESS PHOTOGRAM
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Edited by H. SNOWDEN WARD, F.R.P.S., Founder of *The Photographic Monthly*.

IN THE HIGH COURT OF JUSTICE, CHANCERY DIVISION.

BEFORE MR. JUSTICE NEVILLE.

The Graphic Arts Co. *versus* Hunters, Ltd.

July 6th, 7th, 8th, 11th, and 12th, 1910.

Abridged from the shorthand notes of Messrs. Marten, Meredith, & Co. and Messrs. G. Walpole & Co.

Counsel for the Plaintiffs.—Mr. A. J. Walter, K.C., and Mr. J. Hunter Gray (instructed by Messrs. Blundell, Gordon & Co.).

Counsel for the Defendants.—Mr. J. M. Astbury, K.C., and Mr. Robert Frost (instructed by Messrs. W. J. & E. H. Tremellen, agents for Messrs. Blair & Seddon, Manchester).

(*Concluded from p.* 202.)

Fourth Day.

Mr. JAMES SWINBURNE, recalled.

Cross-examined by Mr. Walter.—He found nothing in plaintiffs' specification except the horizontal position of the plate and the spray thrown up at it.

Mr. Justice Neville said he found more.

In Truchelut there was no apparatus; only an entirely mixed solid and liquid. Solid particles could not be of use in photo-engraving. Water alone would wear away a substance, as in hydraulic mining. Truchelut did not say his method was suitable for photo-mechanical engraving, but witness thought anyone in that line would try it. He did not know how best to proceed to send a mixture of liquid and solid through a machine as sketched in Leigh (Truchelut), but thought a nozzle would not be needed. He would try a clean pipe and great air-pressure.

(A bottle of iron perchloride was put in.) Powdered perchloride could not be blown through without wetting, and when wetted it would have no erosive effect.

In Brooman he thought the liquid came up the pipe in a solid jet and was broken into spray by the metal of the apparatus, not atomised by air. Brooman's fig. 4 would throw sand, and was provided with a steam jet. It formed an acid shower-bath. The inventor used a collotype or jellygraph plate to get an ink transfer on a zinc plate. He powdered the plate with bitumen and resin, which was warmed to form a resist, then etched the plate under the shower-bath.

The effect of the defendants' machine (Mark Smith) should not be described as a Scotch mist driven by high wind, but rather as a mixture of such mists, because the drops varied so greatly in size. Clean etching and depth were of value for stereotyping or electrotyping. The witness felt sure that, revolving at 1600 or more per minute, the buckets on the paddles could not scoop any liquid from the trough, but must catch it from the air. If fumes were sent up the chimney, something must come in to replace them. The machine would give speedy etching, but whether it would give under-cutting he could not say.

Re-examined by Mr. Astbury.—In the Truchelut machine, where it was required "to dash the liquid finely distributed and under great pressure over the whole surface of the plate," he would simply get a suitable nozzle. The problem had been tackled for other purposes, and there was no difficulty in getting a nozzle to give a sort of spray.

When fresh air came in to replace fumes going through the chimney (Mark Smith) it would not affect the fineness of the spray, but would tend to cool the machine.

Professor CHARLES VERNON BOYS, sworn.

Examined by Mr. Astbury.—Had made a study with microscopic examinations to ascertain the precise action of various operations for engraving plates and had read plaintiffs' specification carefully. Had no doubt it would be an effective, useful apparatus. The only method of making the spray given in the specification was by compressed air. At the date of the patent many spraying nozzles were known.

In Brooman, fig. 1, if a plate were put in place of the cloth, and if it were moved at a suitable rate, it would be properly etched. If the plate were not moved it would only be etched where the spray went, and if the spray were unevenly distributed the etching would be unequal.

West's object was to get a resist, for the purpose of etching, to make a printing plate. He had given directions for a model to be made to carry out West's idea, and he did not imagine the plate was to be immersed in a bath. If attempting to etch a plate with a watering-can, one would move it to get even distribution as one did in watering a flower-bed. A plate had been etched in the model, and prints made from it. The plate seemed to be extremely uniform in its etching, without any of the evil effects attributed to flowing. Some of the dots were only just visible with a strong lens, but they were all clean and good. In sand-blast work the subject was held face downward and in other positions.

Truchelut's patent was for combining sand with acid. The diagram seemed to give no instruction as to whether a nozzle was to be used, but it showed that the mixture was to be distributed all over the plate. If instructed to use such an apparatus with liquid only, and to distribute it with great pressure over the whole of the plate, he would put in a spraying nozzle. There was no inherent absurdity in suggesting nitric acid for etching copper. Before the patent of addition, photo-engraving was well known, and the necessity of preserving the dot, etc. In this specification was exactly the same idea and the same fallacy as in the plaintiffs', about the combined abrading and dissolving action. The fallacy was as to mode of action, not as to result. The last sentence gave all that was needed for the process to be put into successful action with the air-blast. It said finely distributed, and common sense showed that it must be evenly distributed. This was obvious at the date of the patent.

The witness had made plates with sprays striking the surface at different angles, and with the plate vertical and in the horizontal position, and could detect no difference in the results.

Comparing the Levy method with Truchelut, there were details of the apparatus and the position of the plate was specified, which were not in Truchelut. Perfection of result could not be separated from the details, such as the multitude of nozzles. Truchelut does not give details, and they are essential to success; but the first three lines of Truchelut's patent of addition might be said to be a general description of the Levy process. A good engraver with the knowledge common to the craft in 1896 could get good results without further invention, but that was a very different thing from saying there was not further invention in Levy. Nothing in Truchelut confined him to the use of only one nozzle; it was simply "finely distributed over the plate."

Certain plates said to have been etched by a model of the Truchelut apparatus, with one discharge-pipe constricted at the end, were perfectly evenly etched. He had examined the dots by means of a microscope with a mirror so that he looked at the reflections of the sides and shoulders of the dots. He examined the fine dots in the high-lights and found their stems and feet perfectly symmetrical, which would not have been the case with tendency to undercutting, or with ill results from flowing. At some of the plates the mordant was thrown vertically, at others from an angle of 75°.

He had four plates, etched by himself, for the same time in the same solution, at the same temperature, but one in the Levy machine, one rocked in a tray, one brushed continuously in a tray, and one etched, face up, in a still tray. The amount of etching and the ratio of depth to undercutting were practically identical in all cases, when carefully measured with the micrometer. When he cut cross-sections and examined them in the microscope, he could not distinguish one from another. The experiments were made with strong acid and etched for a long time, which would tend to exaggerate the undercutting, but it was the same in all. Witness knew of no means of completely avoiding cutting under the resist except by rolling up and shouldering. He had made the experiments to find what actually happened, expecting that the acid would eat sideways as rapidly as it went downward, but in each case the depth grew almost exactly twice as rapidly as the side-cutting. The witness understood that this result was claimed as new by Levy.

Whichever way the plates were etched the flat tops of the dots were equally clean and even, and none of them showed the bad irregular effects attributed to tub-etching by Mr. Ballantyne.

The witness had examined three plates made by Mr. Clarke, had cut through them and smoothed the edge of the cut with water of Ayr stone.

Mr. Astbury stated that A was brush-etched, B etched in the Levy machine, and C in a bath; and that Mr. Ballantyne had thought C was done in a bath but could not see characteristics of spray etching in A and B. The one he thought was done with the spray was really done with the brush.

The witness had examined these with a good magnifying glass, not a microscope. The bath-etched one was not so deep as the other two, and the surface of the zinc was rougher. The others were very smooth and clean. The brush one looked a trifle deeper than the other. The witness did not see any material advantage from the face-downward position, unless the plate were very large, in which case it prevented flowing. He saw no advantage of the spray as regards relative speed of cutting downward as compared with side-cutting. For removing bubbles of hydrogen gas and scum the spray would act equally well in any direction, unless the amount of flow protected the lower part of the plate from the spray. The air-draught would tend to cool the mordant, but the reason given in the Levy specification was all nonsense.

The form of undercutting that disintegrated the sides of the dots, the witness had not been able to get by any process. By stage-etching, when the top and side of the dot were protected by rolling-up, one could get undercutting and a dot like a rivet-head. By rocking, in his experiments he got as good a printing surface as by spraying, but it was slower, and the bottom of the etched pit was not so smooth, unless the brush was used.

With plates placed vertically in front of the spray he had examined parts where the amount of flow would be as 2 : 1, but could see no difference in the etching. He had examined eight plates without knowing what had been their positions. He did not know how this would be with a plate (say) a yard square. Nothing in the plaintiffs' specification suggested that it was only peculiarly fitted for large-size plates.

Witness had seen the defendants' machine running. He agreed with Mr. Swinburne that when running at high speed the liquid could not remain in such position as to allow the paddles to pick up their buckets full. The glass laid over the top of the machine was deluged with spray and rain, and quantities such as would fill a teaspoon thrown over the plate in all directions. The liquid in contact with the plate was all the time streaming backward and falling as it went. It was not all atomised. The flow was constant, but not from end to end, streaming along and dropping off. The liquid from the paddle never hit the plate quite vertically, but almost so at one end, and more obliquely at the end furthest from the paddle. The angles would vary from 70° or 80° at one end to about 40° at the other.

In the plaintiffs' machine the nozzles were in lines about three inches apart, and about one inch between the nozzles in the lines. When the spray was thrown on a stationary plate it struck it in lines, flowed to the space between the lines and fell off in big drops. When the plate was rocked, inequality of action, from the nozzles being in lines, was avoided

Cross-examined by Mr. Walter.—If the jets could be put sufficiently closely together, it would not be necessary to move the plate. Liquid could be atomised from proper nozzles by liquid-pressure without air-pressure, but straight nozzles for making good sprays were unknown.

Brooman was for damping cloth, not for etching; but he made printing surfaces by an entirely different method. In his day photo-mechanical work was not known.

(The model of West's machine handed in.) Witness said it was made to his suggestion. Aluminium was used for the perforated plate because it was handy and not attacked by nitric acid. It was not commercially obtainable in sheet form at the time of the patent, but many other metals could be used. He did not think anyone would use such a model commercially, but it was quite good for the experiment.

If the sizes of dots varied on the plate made in this machine, it was because they ought to vary to give light and shade. He was not aware that the depth varied from the centre to the side of the plate. Half-tone engraving was not known at the time of West's patent, but line-engraving was in use. He had not considered the effect of dirt in the holes when the plate lay face upward.

The witness thought that any solid mixed with the acid would be detrimental in half-tone. He could make the first Truchelut apparatus work if he kept it constantly agitated, so that the liquid and sand were kept intimately mixed. If he dropped the sand and then shot a spray of liquid on to it he would be getting away from the apparatus shown in the picture. For liquid and sand he would not constrict the nozzle, and wet sand and water would not jam a tube so effectively as dry sand. Mr. Ballantyne's "mud pie" would be quite impracticable.

The difficulty with nitric acid on copper was in control. If too weak it would not etch; if strong enough it etched violently; but his recollection was that it was always used for etching copper plates.

In his comparison experiments the spray-etched results did not suffer from the use of bees-wax instead of the ordinary trade resists. He used lines of various widths. The spray was perpendicular to the plate; the brushing was both along and across the lines, with an ordinary camel's-hair brush. If the plate is face downward no brushing is possible, or needed; the position is an excellent way of obtaining the same effect as by brushing. What cooling occurred was not because of compressed air, but because of draught, or change of air.

MR. ALFRED THOMAS CLARKE, sworn.

Examined by Mr. Astbury. — Witness was the managing director of Carl Hentschel, Ltd., which he believed to be the largest photo-engraving firm in the world. When he began engraving, many years ago, the ordinary method of etching was by rocking in a tub and brushing, and this was still very largely in practice. A common method of etching copper plates was to fix them in a frame and leave them quiescent, face downward in a tub of perchloride of iron. It was still in use, largely, in his firm. He had prepared three plates, A, B, and C. A was brushed, B done in a machine like the defendants', and C rocked without brushing. His firm did the highest class of etching. He had heard Mr. Ashworth's evidence and agreed that every result obtainable in plaintiffs' apparatus could be got in a bath, but would take longer. As regards output, if a man were using as many tubs as he could work, he would turn out about the same amount of work in a day as if he used as many of the plaintiffs' machines as he could work.

Witness understood undercutting to mean that the dot had a distinct metallic overhang, so that if it were viewed sectionally it would be a table, and not a cone. This result was seldom obtained nowadays. There was now no trouble whatever with undercutting where bath and brushing were used. This was no undercutting difficulty since the fish-glue resist had been known and worked properly.

The specimen block etched in the model of West's machine was somewhat mealy and had irregular dots in the sky, but there was some similar mealiness and irregularity in the negative, so that it was not all the fault of the etching. In all cases where he had compared dot for dot, the fault in the block was found in the negative. The plate had fair depth, and was in this respect very similar to the one put in by Mr. Ashworth. He agreed that this was good commercial work.

In the plates which had been produced by spraying in different directions he could see no differences, and should not expect to do so.

He had examined the model of the Truchelut machine and thought the compressed pipe was the simplest type of nozzle, as suggested by the drawing. In the plate etched with one jet the cause of the defect was obvious, and the method of avoiding it was obvious. The etching had reduced the size of the dot until it had disappeared. If such an apparatus and result had been given to anyone practised in the art prior to 1899, what to do would have been obvious.

In the case of a plate which had been engraved in a vertical position, the etching at the bottom was rather better and more even than at the top.

His firm had used the defendants' machine for about two years. They had five; he did not know whether they had more. They did not use any other machine. A small percentage of their whole work was done by the machines, the greater part being by tub-etching. The machine was not suitable for the finest copper half-tone. By "finest" he did not mean fine screen, but most artistic work. This was better done by one method of tub-etching than by any form of machine or by brushing. Whichever process was used made no material difference in printing quality of the block.

He had read plaintiffs' specification carefully, and did not remember that it claimed suitability for any special class of work, but for half-tone generally.

He had seen defendants' machine working, through the glass. He thought the mordant was thrown in rather coarse rain, and that a large quantity adhered to the under side of the glass, with a general motion toward the end away from the paddles, and a funny little wave-like motion, backward and forward, but still toward the end. There was a sound as of heavy rain, and one could hear as well as see an occasional splosh about the size of a halfpenny. The machine sounded as if it ran in periods, which he thought were governed by its exhausting all the liquor in the cup in which the paddle worked, and a wait until enough ran back to make it resume its normal sound.

Cross-examined by Mr. Walter.—For all classes of work one attempted to take the plate to printing depth in the first etch.

The very best work was done in the still bath; and it was not necessarily followed by fine etching. It was not necessarily a very slow etch with a weak solution, and one man could do as many plates a day in this way as any other way. He would never think of using the Truchelut method with emery or sand for half-tone work. Three or four still baths were worked by one man in his firm's actual practice; and rocking baths were very little used for half-tone.

The usual method of rocking-tub etching was explained at some length by the witness.

John Swain & Sons, Ltd., used the plaintiffs' machines, and so did other firms. He had examined the various machines on the market as well as plaintiffs' and defendants'.

Re-examined by Mr. Astbury.—He had once believed that machines would etch deeper in proportion to the reduction of the dot than tubs would, but years of experience led him to believe it was not so, and Professor Boys' micrometrical measurements confirmed his practical supposition.

Mr. **Frederick William Peters**, sworn.

Examined by Mr. Astbury. — Witness was a process etcher in the works of Messrs. André & Sleigh, and had been conversant with the art for sixteen years. He had no practical knowledge of machine-etching. He agreed generally with Mr. Clarke's evidence.

(A book of reproductions of Academy Pictures handed in.) Some of the plates were etched in a rocking bath, others face downward. He had long known the method of etching face downward. He had seen it in use before the plaintiffs' patent in 1889; he had done it sixteen years ago, and had heard of it before he was in the trade.

He did not agree with Mr. Ashworth that one could get every result in a bath that could be got with any spray process—the bath could give a better result, most emphatically. He knew of nothing obtainable by the spray process that could not be got by the bath. In the machine before them a batch could not be etched as quickly as in the tub, for the one tub could take twenty-five plates of (say) 5 by 4 which would be etched in ten minutes, while the machine would not take more than two or three. It was important to take the plate out when it was just sufficiently etched, and this was easier in a bath when the etching was a matter of minutes than in a machine where it was a matter of seconds.

The etching made with the model of West, compared with the negative, had a fair gradation of tone all over the plate.

One could see at a glance what was wrong with the plate made by the single-pipe Truchelut machine.

Cross-examined by Mr. Walter.—For high-class work they would use hand-work. Ten minutes was the usual time for the deep etch. In the still bath the plate was supported on clips, face downward. Some of the plates in Cassell's *Royal Academy Pictures*, 1898, were etched by the witness by the face down method.

MR. JOHN AUGUST COTTRELL, sworn.

Examined by Mr. Frost.—Witness had been a process engraver about twenty-five years. He had heard the evidence of Mr. Clarke and Mr. Peters, and agreed with them generally. He had done face-down bath etching about fourteen years ago. It was a rocking bath, so that part of the time the plate was in, and part of the time out of the mordant. He had also used the still bath in the same way.

(A proof produced.) Witness had made the plate from which this was printed, in a rocking bath without brushing or retouching.

Cross-examined by Mr. Walter.—The absence of detail was due to the original.

MR. ALFRED THOMAS CLARKE, recalled.

Had prepared the plate from which proof H.B.6 was taken, in a bath without any touching or any brushing except at the end, to remove the oxide from the plate and to give it a finish.

MR. WILLIAM EWEN, sworn.

Was an etcher with the Guardian Printing Company at Reddish, and used the defendants' machine. Had etched four plates. No. 1 with the Truchelut model, and the plate at an angle of 75° back from the hose pipe. No. 2 was made with the same model and the plate vertical, No. 3 with the Brooman model and the plate face downwards; and No. 4 with the plate held face downward over the Truchelut model, laid on its back with the nozzle pointing upward. He was used to engraving and to plates, and could see no appreciable difference in these four.

He had made four other plates with the Truchelut model; 251 V. with the plate at the right hand bottom corner and inclined at 75°, No. 252 V. with the head of the subject downward, at 75°. No. 253 V. was done with the subject head downward and the plate at the right hand top corner. In 274 V. the plate was laid sideways, at the same angle to the nozzle. The strength of mordant and time of etching was absolutely the same in all these cases—in each set the conditions were comparable.

He made the plate which was etched in the West model, which had forty-eight seconds under the shower and no other touching whatever. It was a satisfactory reproduction from the negative.

Cross-examined by Mr. Walter.—The Guardian Printing Company were Messrs. Taylor, Garnett, Evans & Co. He did not know if they were financially interested in the defendants' machines, but they made them. He did not know if they made the model of Truchelut. He had only worked for them a few days—since he began these experiments. He did not know the pressure of air. The acid was 1 in 20, and the plate was held stationary in a trough eighteen inches away from the pipe. He was not told what strength of acid to use. He did not know who made the West model. The plate in this case was laid on top of a glass measure.

About the Brooman model he only knew that he had etched one plate on it. This plate was laid face downward on two strips of glass.

The results were poor, but the original photogram had evidently not been sharp. They were a printing depth, and were etched in 25 to 30 seconds. In the rocking bath he would ordinarily take two to three minutes to etch a zinc plate, but he agreed with other witnesses that ten minutes would be necessary for some subjects.

Re-examined by Mr. Astbury.—The negative would not admit etching much deeper. An etcher could judge from the negative how far it was safe to etch. The original of these plates was about as bad as it could be, but the plates were all about equally good or bad. For testing depth of etching, and undercutting, the quality of the original did not matter.

Certain plates were handed to Mr. Justice Neville; and this concluded the defendants' case.

[The judgment was given in our August issue, pp. 195 and 196.—Ed.]

Machine Etching.

No. XIX. The Smith-Ahle Machine.

Previous articles and notes.—1906: I. Jan., Dr. Albert's Method: *II. Feb., Concewitz's Method; *III. March, Levy's Method, and notes; IV. May, the Holmström Method; *V. June, Swain's Views on the Levy Method; VI. Sept., W. G. Thorpe's Method; *VII. Oct., The Mark Smith Method; *VIII. Nov., More about the Mark Smith Method; *IX. Dec., More about the Dr. Albert Method, and notes. 1908: X. Feb., More about the Mark Smith and the Dr. Albert Method; *XI. June, The Method of Guillo Danesi; *XII. July, The Boyce Machine; *XIII. Dec., Dr. Albert's Patent; 1909: *XIV. May, Piolunkowski's Patent; *XV. June, The Holt Etching Machine; *XVI. July, The Mark Smith Rotary Spray Etching Machine; *XVII. August, The Levy Process. 1910: *XVIII. July, A. M. Truchelut's Patent. See also May 1910, The Theory of Hand and Machine Etching; July 1910, Dangers of Machine Etching.

* Indicates illustrations.

Albert R. Smith and John F. Ahle, of Los Angelos, California, claim "improvements in apparatus for etching, and a device for successfully and quickly etching a plate by causing the plate to continually alter its position while being subjected and exposed to the action of dilute nitric acid.

"We have discovered that a plate, upon the face of which is imprinted a design, after undergoing continuous subjection to an erosive medium, either in the form of a rain or in a bed supplied, which is caused to rock, shows material defects. These produce a picture blurred and marred, and close scrutiny of the treated plate discloses ragged etching of the metal. Such a condition is attributable to the uneven and forcible application of the acid to the face of the plate. If the liquid is allowed to fall in jets upon the face, even though the angle of the jets is changed in its descent relatively to the plate, or if the subjection of the same occurs in a rocking tub, the corrosive action of the liquid upon the plate is in no manner uniform, because the full impact of the fluid upon any particular part of the plate causes a promiscuous distribution, inasmuch as some parts of the plate receive the full force of the descending stream, while the remaining portions receive only that amount of force which is disseminated and spattered about by the first impact of the stream. Thus we have found that by this method, undercutting is an unavoidable result of the processes and devices hitherto employed; and in the apparatus we are about to describe these disadvantages have been overcome.

"We place the plate on a slight incline and cause the revolution of the same, whereby the entire face of the plate receives a uniform application of the acid, and forestalls any uneven distribution of the same. The acid is forced under pressure upon the face of the plate at an angle. It is never allowed to strike the face of the plate in bulk. The drops of the dilute acid are broken up previous to striking the plate, that is to say, the acid strikes the plate in the state of a diffused liquid, after being impregnated with atmospheric air under pressure. This increases the erosive action of the liquid to such an extent that less than one half the time usually required is expended in the completion of the work. By this construction no accumulation of acid on the surface face results, which is usually the cause of undercutting.

"The inclination of the table within the casing prevents the accumulation of any acid upon the face of the plate to be etched. The acid is allowed to fall off the revolving table at the lowermost point, which is always changing when the machine is in operation. In known devices of similar kinds, the unevenness of the acid upon the face of the plate is productive of the same undesirable results, because more acid is allowed to take effect on the edges than on the centre, consequently producing an uneven distribution of the liquid. We have also discovered that devices used for the accomplishment of this purpose have been costly and difficult of construction. The great cost of machines has been the most serious disadvantage to their marketable value, chiefly on account of the highly expensive material used in their assembling. Acid-resisting materials of known kinds, such as porcelain, china, rubber or the precious metals, are so costly as to make the sales of many machines thus fitted out almost prohibitive. We propose to employ a metal in the construction of our device, with which to line the entire interior mechanism forming part of the invention. This metal is aluminium. It is inexpensive, easy to handle, and non-corrosive to the action of nitric acid, either concentrated or dilute.

"In the drawings: Fig. 1, a longitudinal vertical section. Fig. 2, a top plan view showing the glass cover. Fig. 3, a fragmentary detail of the supply tank, spray pipes and valves assembled. Fig. 4, an enlarged sectional, side elevation of a fragment of the casing showing the pump, in section, and the inlet and outlet pipes partly in section. Fig. 5, a bottom plan view on an enlarged scale, showing the perforations and the attachment to the supply pipe, which is shown broken. Fig. 6, a front elevation with the air supply pipe omitted. Fig. 7, a rear end elevation. Fig. 8, a plan of the table detached from the balance of the mechanism. Fig. 9, a bottom plan view, showing the rectangular socket for engagement with the stud. Fig. 10, a fragmentary enlarged detail of the table and its mountings, and fig. 11 is an enlarged fragmentary detail of the valve for controlling the flow of liquid to the spray pipes.

"Special reference being had to the drawings, 1 represents a casing having an inclined bottom 2. The upper portion of the casing is provided with a glass cover 3, resting on offsets 4 in the framework of the casing, in order to allow the operator to conveniently view the progress of the work within.

"5 is an acid-resisting lining, preferably aluminium, with which the interior of the casing is fitted out. On the bottom of the casing and approximately centrally thereof, the said lining terminates in a solid boss seen at 6, having a bore 7, arranged to accommodate a pin or stud 8 extending through an opening 9 in the bottom of the casing. This pin or stud 8 has on one end a squared or nut portion 10, and is arranged to loosely fit in a socket 11, provided in a boss 12 of the table 13.

"As seen at 14, the boss 12 is for a part of its distance solid and terminates in a shell or sleeve 15, loosely fitting over the boss 6, on the bottom of the casing. This provision prevents the entrance of any acid to the support for the table and the consequent corrosion thereof. Said table 13 is inclined in a plane parallel to the bottom of the casing. Its face is aluminium, and provided with riffles or corrugations 16. The other end of the stud or pin 8 is carried by the bracket 17, and has rigidly mounted thereon a bevel pinion with

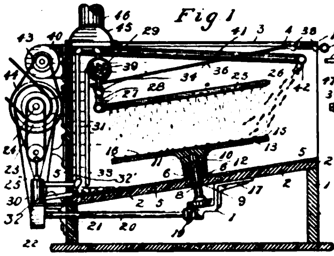


Fig 1

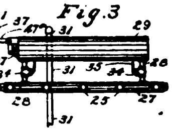


Fig. 3

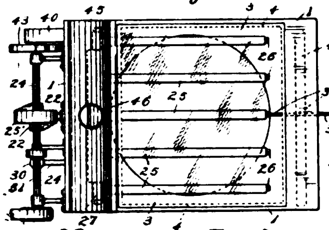


Fig. 2

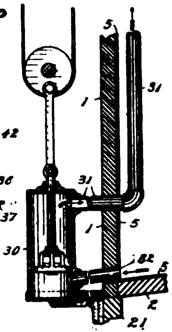


Fig. 4

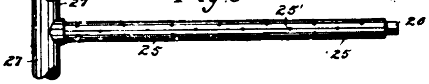


Fig. 5

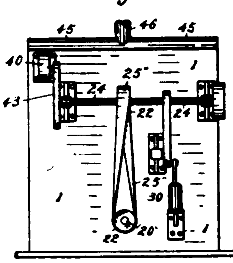


Fig. 7

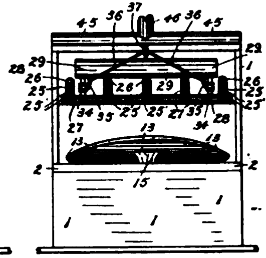


Fig. 6

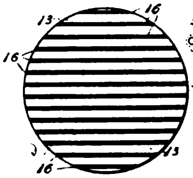


Fig 8

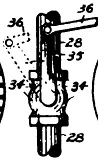


Fig. 11

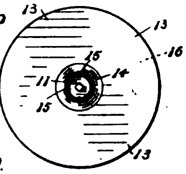


Fig 9

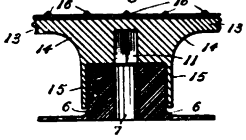


Fig. 10.

which a similar bevel pinion 19 meshes. Said pinion 19 is fixed on a shaft 20 extending through one wall 21 of the casing and has one end journaled in the bracket 17, fixed to the bottom of the casing. The other end has a pulley 22, which is connected with the pulley 23, fixed on the line shaft 24, by belt 25″, and through which motion is transmitted to the table 13.

"25 is a plurality of perforated spray pipes located above the table 13, and at the same angle to the horizontal. The perforations are seen at 25′. These pipes are provided with screw plugs 26, at the end, to permit cleansing of the interior of the pipes, when necessary, and are screwed into a supply pipe 27, connected by pipe 28, with a tank or reservoir 29. The tank is supplied with etching fluid from the pump 30, through the pipe 31.

"32 is a pipe extending through the wall 32′ of the casing and arranged to serve as an intake for the pump 30, which forces the acid into the tank 29, continuously during the operation of the machine, thereby avoiding waste of the acid and allowing the full strength to be extracted.

"33 is an overflow pipe communicating with the tank 29 and having its free end extending down to near the bottom of the casing, the object of this pipe being to permit the acid to return to the bottom of the casing when the etching of plates is temporarily interrupted, as when new plates are to be placed on the table. The supply of acid is cut off from the spray pipes 25 by valves 34, provided on the pipes 28, which connect the tank with the supply pipe 27. Links 35 are connected with the valves 34, on to which are pivotally secured rods 36, which are joined to an operating handle 37, secured by hangers 38 to the under side of the upper portion of the casing, and by means of which the flow of acid through the spray pipes 25 can be cut off by the operator. This action, however, in no manner interrupts the continued operation of the pump, since the valve 39 in the overflow pipe immediately opens and allows the fluid to escape to the bottom of the casing, where it is again sucked in by the pump and delivered to the tank.

"To regulate the pressure in the tank 29, which may be necessary when the mordant does not pass through the spray pipes sufficiently fast, we provide on one end of the tank 29 a valve or plug 47, fastened to one end of a bell crank lever 47[a], which is provided with a threaded shank to receive a counter-weight, not shown in fig. 3, by the movement of which the amount of pressure actually needed in the reservoir may be regulated. This valve or plug 47 fits in an opening 48 provided therefor in the tank 29. Thus if the pressure of the liquid in the tank 29 exceeds a predetermined amount, the excess pressure will force the valve 47 out of its seat and allow the liquid to escape.

"40 is a rotary fan attached to the upper end of the casing. A pipe 41 is connected with said fan and extends forwardly in the casing.

"42 is a perforated pipe fixed to said pipe 41, and extending at substantially right angles thereto. It is slightly in advance of the terminus of the spray pipes, and serves to direct air jets upon the face of the plate to be etched, in order to increase the oxidising action of the acid. The fan is rotated by belt 43, connected with pulley 44 on the line shaft 24.

"The upper rear end of the frame of the casing is open, and over the opening provided therein is a hood 45, having a vent 46, which communicates with the atmosphere. The fumes arising from the acid are caused to escape into said hood and out through said vent. Inhalation of the injurious fumes is therefore avoided and the work of etching carried on with perfect safety to the operator.

"The machine may be flushed with fresh water to remove zinc particles from the casing or to cleanse the same of any old acid. This cleaning can be done through the same pipes which convey the acid to the tank and spray pipes.

"The used acid may be drawn off in any manner, as by providing connections directly with the pump whereby the fluid is sucked out of the casing and discharged into a sewer."

The Levy-Hunter Law-suit.

THIS case seems likely to have an importance in law and in patent actions of the future, for it has established a new point, and, if the views of certain American experts and lawyers are correct, has shown a material difference between British and American judgments on a point of great value.

This is brought out in the following extract from *The Journal of the Franklin Institute*:—

"A case of considerable interest to American inventors holding English patents was decided on July 9th ult. in the British Court of Chancery by Mr. Justice Neville, as appears from the full report of the judgment in the August issue of *The Photo-Engraver's Monthly*, London. The action in question was that of the Graphic Arts Company, of Philadelphia, against Hunters, Ltd., of London, for infringement of the English patent on the Levy acid blast by the device known as the Mark Smith etching machine.

"The phase of the matter which is of interest is presented by the fact that the judgment dismissing the action with costs was rendered on the specific ground that one of the claims of the patent was too wide; in other words, the decision is based on a stated legal technicality without regard to the question which was really at issue. The conclusion of the judgment is as follows:—

> "'I have been invited to read the whole of the first ten claims as each claiming the whole of the invention described from different points of view, but the words used will not, I think, allow of it. The claims appear to me to be addressed to different combinations of the various parts of the process. I am informed that, according to American law, the invalidity of one or more claims does not invalidate the rest. This may possibly explain the character of the claims. Be this as it may, I think Claim 1 is too wide, and on this ground that the letters patent cannot be supported. The action must be dismissed with costs.'

"This in sharp contrast with the principle laid down by our American courts in similar cases, as appears from a recent decision in an action for infringement of the Gathright Tabulator patent. The United States Circuit Court of Appeals, in sustaining the patent, declared: 'In short, we are constrained to say that to this inventor belongs the credit of constructing the first commercially successful tabulator. His invention belongs to that large class which has ever been treated with liberality by the courts, when the inventor, by an apparently simple change, addition, or transposition of the parts, has converted imperfection into completeness.'

"The practice of the English court in this respect, as evinced in the judgment above cited, is to be carefully noted by all who have any interest in British patents."

One outcome of the case is the following:—

Patent Notice.

Notice is hereby given that Graphic Arts Company, of 1221 Spring Garden Street, Philadelphia, in the United States of America, late of 1213 Race Street, Philadelphia, seek leave to amend the Specification of Letters Patent No. 2710 of 1899, granted to William Fairweather, C.E., of 62 Saint Vincent Street in the City of Glasgow, Chartered Patent Agent, for "Process of and Apparatus for Producing Etched Metal Plates."

Particulars of the proposed amendment were set forth in the Illustrated Official Journal (Patents), issued on the 24th August 1910.

Any person or persons may give notice of Opposition to the Amendment (on Patent Form No. 18), at the Patent Office, 25 Southampton Buildings, London, W.C., within one calendar month from the date of the said Journal.

W. TEMPLE FRANKS,
Comptroller-General.

Messrs. Page & Rowlingson,
Chartered Patent Agents,
London, E.C.

A Denial.—It being persistently rumored that a well known and highly respected firm of publishers and printers has a direct financial interest in the Half-tone Engraving Company, Ltd., we desire to inform printers and publishers that no firm or person connected with these trades has any financial interest whatsoever in this company, and that reports to the contrary are maliciously designed to weaken the confidence which customers have found themselves justified in reposing in this company.—J. C. Heard, Managing Director.

The Valentin-Zerreiss Method of Half-tone.

Auguste Valentin and Jean Verreiss of Puteaux and Courbevoie respectively, include in their patent for an improved method of making a half-tone screen quite a treatise on the screen and its use. This seems worth reprinting almost at full length, so we divide it between the present and the next issue. The patent covers the making of the screen and the process of half-tone in which it is used, and is applicable to intaglio as well as to relief-printing plates.

"In the accompanying drawings figs. 1 to 9 illustrate the production of screens, and figs. 10 to 14 illustrate the manner in which a printing plate is etched.

"General Description of the Process for obtaining Plates engraved in Intaglio.

"A thin copper plate, well planed and polished on one of its surfaces, is prepared, and on the whole surface of the said plate is spread a layer of the following solution: Water 500 grains, bichromate of ammonia 12 grains, sugar 8 grains, gum arabic 110 grains, ammonia 9·9 drops.

"The plate is then whirled above a gas stove giving off a gentle heat which assists the drying.

"As soon as it is dried and cooled, the plate is ready for being provided with a screen, produced photographically, by using as the original a network arranged in a peculiar manner, as will be hereinafter described, and having one of the shapes shown in figs. 4, 6 and 7 according to the nature of the positive original to be engraved.

"The plate, suitably printed and developed, will have on the whole of its surface the image of the screen constituted by a series of elements produced by the bichromate solution having been rendered insoluble where the light acted, under the transparent elements of the screen. These elements are equal to each other, and their geometrical centres are at the same distance from each other. The degree of exposure must be calculated so as to give to the elements of the layer a sufficient resistance to the action of a mordant during a certain time. They must afterwards crack when the action of the mordant continues beyond that time.

"As soon as the metal plate provided with the screen is developed, it is covered with the following solution: Water 360 grains, beer 100 grains, bichromate of potash 15 grains, citrate of iron 1·3 grains, sugar 4 grains, albumen 120 grains, glycerine 2 grains, nitrate of silver 5 grains. The above must be mixed and 125 grains of fish glue added to it.

"The above solution is kept at a temperature of about 17° Centigrade (63° Fahr.). It is spread on the whole surface of the plate on the whirler, and as soon as it is dry it is ready to receive the photographic image to be engraved. The image is reproduced photographically in the printing frame with the prepared surface of the plate in contact with the positive original. After a sufficient exposure the plate is varnished on the back and is ready to be engraved, in a solution of perchloride of iron of 45° B., in a quantity sufficient for covering the whole surface. The perchloride will pass at first through the second layer at the portions which have been little exposed—that is to say, at the portions corresponding to the shades. It will attack the bare portions of the metal which will be hollowed out, a kind of cup

Fig. 1.

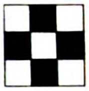


Fig. 2.

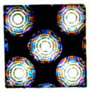


Fig. 3.

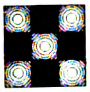


Fig. 4.

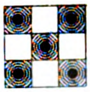


Fig. 13.

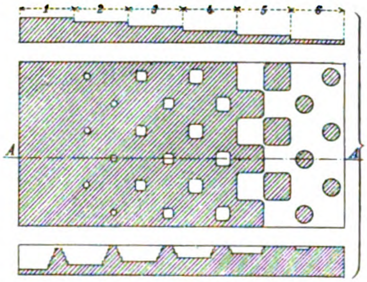


Fig. 8.

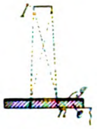


Fig. 5.

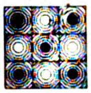


Fig. 6.

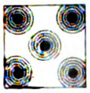
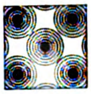


Fig. 7.



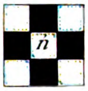


Fig. 9.

Fig. 12.

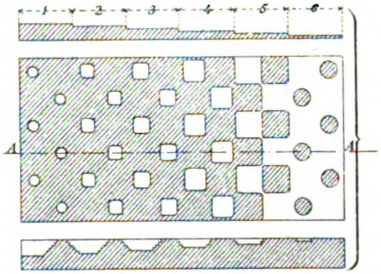
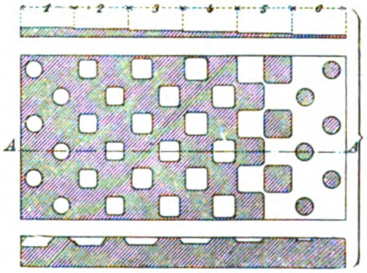


Fig. 14.



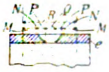


Fig. 10.

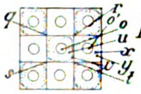


Fig. 11.

being formed. The corrosive action continuing, the walls of the said cup will be corroded and the elements of the screen of the first layer reduced. The perchloride will pass afterwards through all the tones of an intensity immediately below the strong shades, and successively through all the tones in proportion to their degree of exposure. The action of the mordant will be stopped by washing with water as soon as it begins to attack the strong lights. The action of the mordant produces a black oxidation of the metal, which enables the engraving operation to be followed.

"The etching having been completed, the plate, cleaned with potash, is ready to be inked and printed.

"IN HALF-TONE WORK.

"For obtaining plates in relief, for typographic printing, the process is the same as just described, but in that case are used negative originals. On the other hand, the cracking of the elements of the screen during the etching must be delayed and become apparent only in the strongest lights of the subject. This can be brought about by an increase of strength of the elements produced on the first layer, by a longer exposure of the screen, and by a weak burning of the first developed layer.

"MECHANICAL EXAMINATION OF THE PROCESS.

"As will be readily understood from the explanations of the foregoing general description, the shape of the screen and the nature of the layer constituting the same play an important part as regards the final result.

"The constitution of the second layer required for forming the image being, so to say, invariably fixed in accordance with a formula which gives the best results as regards strength and uniform permeability, only very small variations in the results could be obtained in practice. The researches of the applicants were chiefly directed, with regard to the said second layer, to the chemical composition of the sensitive solution by means of which it is possible to obtain, practically and in a thoroughly industrial manner, engravings which can be compared in every respect to those produced by the layer of bichromated gelatine used in heliographic processes.

"The modification of the final result in accordance with the nature of the originals employed is produced by the modification of the shape of the screen, of the nature of the screen layer, and the density of the mordant.

"PREPARATION OF SCREENS.

"A very good glass, without any grooves and perfectly flat, is taken and prepared in accordance with the methods usually employed in the wet collodion or any other similar process. The glass thus prepared is arranged as usual in the frame of a photographic apparatus provided with a screen-holder into which is placed an ordinary screen.

"The whole is placed in the apparatus in accordance with the methods generally used in photo-engraving, so as to produce, by exposure and on the development, on the whole of the surface of the sensitive glass a check pattern of the shape shown in fig. 1; that is to say, formed by squares rendered absolutely opaque by an energetic intensification. These points are in contact with each other at the corners, and are very sharply defined at the side of the transparent squares which separate them. The glass is covered with rubber, then again covered with collodion and rendered sensitive. It is then replaced in the frame exactly at the point where it was at the first exposure in the chamber. Exposure is again made by suitably arranging the screen and using for the exposure a larger opening in the lens diaphragm than was used for the first exposure, thereby producing slightly on the whole surface newly rendered sensitive, shaded off or 'degraded' points of the shape indicated in fig. 2.

"The glass being during the second exposure exactly at the same place as it was during the first exposure, the said degradation or shading off will be effected at the transparent portions of the first screen, and completed at the centres of the same portions in points rendered transparent by a suitable reduction. The screen, obtained by the combination of the two superposed images produced by the two layers differently exposed, as just described, will have the appearance shown in fig. 3. The final screen required for the following operations will be obtained by producing from the screen thus made a photographic countertype which at the development will present successively transparent, shaded-off or degraded and opaque elements shown in fig. 4.

"POSSIBLE MODIFICATIONS OF THE NATURE OF SCREENS FOR THEIR USE IN THE DIFFERENT PRACTICAL CASES.

"In the foregoing, the simplest method of proceeding for obtaining normal screens adapted to the conditions most frequently occurring in practice has been given. In certain cases where it is desired to have a high degree of fineness, as well as a complete reproduction of half-tones, it will be advisable to make other types of screens which, being more complete than those first described, will make it possible to produce on the first layer of the metal plate a greater sensitiveness to the action of the mordant. Thus the screen previously described is again covered with a solution of rubber rendered sensitive, and exposed as before, replacing the round opening in the diaphragm by a square opening so as to obtain square points on the third sensitive layer of the plate, after a suitable exposure and development; the geometrical centres of the square points will coincide with the geometric centres of the round points formed on the first and on the second layer, and the screen will appear with three series of points of different intensity and of different shape uniformly superposed on each other on the whole of the surface plate.

"For making the screen shown in fig. 5, a glass is sensitised in the usual manner and arranged in the camera with the network screen at a suitable distance, whereupon a round diaphragm with a small opening is placed in the lens and on the easel is placed a strongly lighted white paper. The sensitised plate is exposed for about two minutes, is developed, and there will appear on the whole surface round opaque points. Fix, wash and dry; then after covering with a weak solution of rubber, again coat with collodion and sensitise. Replace in the camera, again expose behind the network screen (care being taken to move it a little further away than during the first exposure), a round diaphragm with a larger opening being used. After a suitable exposure there will appear, after the development, on the whole surface of the glass round points superposed over the first ones and of a larger surface, and a network screen will thus be produced, provided on the whole of its surface with fine opaque round points or dots arranged in the centre of other round points more widely dispersed and more transparent, that is to say, a screen with two gradations. This screen having been produced thus, the plate is again covered with a solution of rubber, with collodion, and sensitised, then exposed in the chamber behind the network screen arranged as before, a square diaphragm being used for this exposure in order, after the development, to produce, on the whole surface of the plate, square points touching each other with their corners, and the operation is continued, the sensitive layers being superposed and secured to each other by the weak solution of rubber.

"The superposition of these different forms of screens on one and the same glass will form the screen shown in fig. 5.

"As is well known, the points produced on a sensitised glass through a network screen vary in shape and in distance from each other according to the shape of the diaphragm used and the distance of the network from the sensitive glass; it will thus be understood that it will be easy to vary to an infinite extent the forms of network screens, superposed in the manner described on one and the same glass. On the other hand, it is possible to give to each of the superposed sensitised layers different degrees of opacity by reducing the intensity after the development by means of a solution of cyanide of iodine. Thus for the screens shown in figs. 6 and 7 round diaphragms will be used, the openings of said diaphragms increasing with each of the sensitive layers placed on the same glass, the said layers being suitably treated after the development to produce finally a gradation of intensity of the different forms of points that will have been superposed.

"It will be evident that the screens can be constructed so as to give a larger area to the transparent elements as shown in fig. 6, or to the opaque elements, as shown in fig. 7."

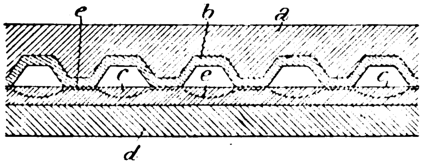
(*To be concluded.*)

Another New Half-tone Method.

Rudolph Widmann of Munich claims patent for a new method of using the half-tone screen, which he describes and illustrates as follows:—

THE object of the invention is a method of making photographic pictures with a grained or half-tone effect by the employment of screens with a relief-like surface similar to the well-known metzograph screens.

In contrast to the ordinary screens with a smooth surface, *e.g.* cross-line screens, where the surface consists of transparent and opaque parts, or screens in which the surface has unit areas of varying degrees of transparency or translucency, the screens I employ for my method have their surface divided up into two sets of surface units, one of which is in relief, so that the surface units at adjacent places lie in different planes, but the screens are nowhere opaque. Such a screen has a light-action differing from smooth-surfaced screens, as the recesses act in lens-like fashion during the printing, and break up the photographic picture according to the kind of surface division employed. A screen of this kind is already known in the metzograph screen, which is used in a similar way to the cross-line screen, the photograph being taken through the screen; and the screen and negative, both before and after exposure, are quite separate from and independent of one another. The same remark also applies to the printing operation.



The essence of the present invention consists in the mode of using these screens, by their being coated with a photographic emulsion on the screen side, and either thus used as they are for taking a photograph, or the photographic film after it is dry is removed and used alone for taking the photograph. The finished negative is then printed in the usual manner.

It is to be noted that the invention resides not in the screen itself, but in the method of using it, as, compared with the method with the metzograph screen, the photographic film and the exposure come on the screen itself, whilst the metzograph screen is photographed through. The improved technical effect obtained by the screen and its method of use according to my invention, as compared with ordinary screens with perfectly smooth surfaces, and also as compared with the metzograph screen, consists in obtaining the so-called double printing with particularly strong printing contrasts. In order to be able to control or modify the amount of contrast obtained, either the reliefs or the hollows of the screen surface can be colored or made matt, as hereinafter explained.

The accompanying drawing shows in section on a greatly enlarged scale the printing arrangement of such a combined negative and screen. *a* indicates the screen, *b* the negative, *c* the printing medium arranged in contact therewith (*e.g.* a chromium gelatine film), and *d* its support or backing (*e.g.* a metal plate). *e* indicates the printing action, and shows the amount of actinic action at different points. Those parts of the negative which during exposure are nearer to the lens, that is, the raised portions, receive a stronger lighting, and therefore develop blacker and denser than the parts of the negative film lying in the recesses or hollows of the screen, and also during the printing operation the said recesses, being arched, collect and condense the rays of light like a lens. The negative has thus a double printing action. It will be seen, therefore, that below the depressions in the negative and screen the actinic action is substantially stronger than under the parts in relief, which are in contact with the printing medium. By this means the image in the developed chrome gelatine copy or print will consist of strongly printed areas and others less strongly printed, which latter, according to their shading or graduation, are more amenable to the action of the mordant or etching fluid. Such developed chromate gelatine prints can either be electrotyped, or they yield good printing blocks by etching without special after-work.

Instead of glass, the screen base could be made of celluloid or gelatine or like substances, for instance, by impressing or moulding, and be coated on the screen side with the photographic emulsion, or suitable photographic (sensitive) films having a relief-like screen surface could also be employed without a separate support.

In order to increase still further the contrast obtained in printing by the two series of surface units, the parts of the screen in relief could be made matt or colored, with the depressions as far as possible of clear glass. The matting or coloring will retard or weaken the actinic action but not completely stop it. The raised portions are usually made with a matt or colored surface in the case of glass screens; for example, by the burning in of enamel colors or by etching the screen from suitable cover-glasses. Photographic films with a relief-like surface can be produced by a colored photographic emulsion being poured into the hollows or pits of the screen and when dry applying a colorless emulsion, so that when exposed and developed the film will have clear parts admitting of a stronger actinic action and colored parts which will give decreased printing action, compared with the former. The negative film is stripped off the screen when dry and may be employed by itself. As it is moulded on the screen, it assumes the surface form of the screen, and this form is retained after the film is removed from the screen mould. A colorless emulsion can be used, and the relief parts of the film matted in any known way.

Another method consists in the depressions of the screen being matted or colored. In this case the raised parts of the negative will print normally, like an ordinary negative, while the matted or colored deeper parts of the negative will only permit a reduced or weaker printing action to take place, so that a varying printing of the parts of the image thus takes place, but longer printing is required. The coloring of the depressions in the negative can be effected in any well known manner.

THE BOSTON STRIKE which commenced on July 26th was still continuing when last advices reached us, except in the Essex, the Star, and the Union Engraving Companies, which granted the men's demands almost at once. These demands were:—Eight hours day, increase of minimum wages, time and a half for overtime work, double pay for Sunday work, an agreement as to apprentices, and abolition of the black-list which is said to be used by the employers. The strike continued in eight engraving companies and four printeries with process departments.

The Pictorial Age

Address delivered by Louis Edward Levy before the Annual Convention of Employing Photo-Engravers' Association of America in Toronto, September 5-6, 1910.

TIME was that archæologists call the Age of Stone a period of some thousands of years during which mankind had gotten no farther in its course of evolution than to learn how to use one flint to chip another. This, we are told, was succeeded by an Age of Bronze, a time when men had learned to fashion native copper into shape and to mix it with zinc or tin in a melting-pot, a time when they first learned to mould clay and bake it into pottery. Then came an Age of Iron, bringing us down to the dawn of historic time and merging into a period characterised as the Golden Age. A later epoch brings silver to the fore, though whether at a ratio of 16 to 1 or what no record has as yet been disclosed. And then, with the centuries of the Classic Period, the tide of human progress is again marked by new application of iron and of bronze, and later on, during the thousand years of the Dark Ages, the only progress is again in the use of stone. Then came the period of the Renaissance, which, considering its rococo development, may be fitted into this present category as the Age of Paint and Putty. But with it came the era of Printing, that art preservative of all arts, destined to continue its impress for all time to come. The Renaissance ended with the beginning of the Age of Steam, which ushered in another Iron Age, bigger and more significant than that of yore, and this has merged within the lifetime of the present generation into an Age of Steel. And what next? The next is already here, and here for good and all. What is it that more than anything else distinguishes our present day from the times gone by, recent or remote? Pictures. What is it that has overcome us more, much more, than like a summer's cloud, and greatly to our special wonder? Pictures. They address us on every hand, speak the tongue of every land, talk that a child can understand, do pictures. Ours is the Pictorial Age, and it is going to last for ever. We have, indeed, been overcome by it, as by an avalanche, and there is yet more of it to come.

Let me quote here from an article which I contributed to the *American Annual of Photography* for 1890.

"Just fifty years ago" — it is now seventy—"Daguerre's fortunate discovery was published to the world, and in the same year Mungo Ponton recorded the first notice of the light-sensitive properties of chromic compounds. Twenty-five years later the germs of the collotypic processes were just being hatched out, and to-day the brood of photographic, collotypic, and chemiglyphic processes has become so numerous that only a Special Committee of some future Pan-Graphic Convention will ever manage to get their very names disentangled."

Such was, indeed, the case at that time, but to-day a dozen committees would have to be at work each on some specia line of the photo-reproductive arts, and the proceedings of the Convention would be a continuous performance with a new bill almost every day. About the time in the early sixties of the last century, when I first smelt collodion under Jex Bardwell's tutelage in Detroit, the early pioneers of "process" work were yet groping along their difficult paths towards the goal before them, little thinking that they were marking the way for one of the greatest advances of the modern world. Niépce and Poitevin in France, Fox Talbot in England, Pretsch in Vienna, and Scamoni in St. Petersburg, were striving to bring the camera into harness with the printing press, and their work, developed by a number of their younger contemporaries and enlarged upon by a host of later workers, has resulted in giving to this modern time its distinctive impress as the Pictorial Age.

How completely this twentieth century is being characterised by the pictorial arts can be realised if we but take a moment's pause to look about us. The daily newspaper, the weekly gazette, the monthly magazine, the journals of science and art, the repositories of information for the farmer, the mechanic, the merchant, the manufacturer, the doctor, and the lawyer —at least the patent lawyer—and, not the last and by no means the least, the ladies' magazines and home journals, are all upon us from morning to night, every day in the week, including Sundays, and all are full of pictures. The monthlies get summarised in annuals and yearbooks, in calendars and almanacs of high and low degree, and all are full of pictures. And besides all these, there is the endless swarm of periodicals devoted to sports and to fiction, to fancies and fads of every name and nature, many of them having no other reason for existence and most of them no other basis of existence than that they are full of pictures. But these, at least, have the virtue of some artistic quality, and the publications themselves have, at least, the merit of being cheap in price. They are thus, with all their wealth of illustrations, within the reach of the masses of the people, and for them as well as for the classes the pictures afford at once both entertainment and instruction.

Vast, indeed, has been the influence of the modern graphic arts in raising the culture level of the masses of the community. The great educational movement of our time, which is so fast changing the complexion of the social structure, has unquestionably been fathered by the dissemination of intelligence through the teeming products of the popular press, but these products themselves, as is clear enough, would but scarcely have seen the light or made their way without the added impulse given to them by the pictorial arts. The extent to which this tendency has gone can be noticed by even a casual observer. For instance, who has not been more or less impressed by the educational influence of the picture postal-card? It has been said, indeed, that the picture postal has been the cause of a sad decline in the art of letter-writing, but the fact remains that its laconic message often tells what even the most graphic pen could not describe, and furthermore, it most frequently takes the place of a message which otherwise would not have gone at all. The picture postal, like the picture book and the picture card, is for the millions a ready purveyor of intelligence in a form which all can appreciate and understand, and through these agencies the modern graphic arts have exerted an educational and edifying influence on the masses of the people in all the lands of civilisation. In fact, the photo-reproductive processes have become one of the most potent factors of social progress, in that they have opened up for the masses a wide avenue of culture and a whole world of æsthetics formerly accessible only to the classes, and but sparingly even to them.

But aside from the æsthetic aspects of this Pictorial Age of ours, there are yet some other of its features that are scarcely less important. Perhaps the most significant of these is the part which pictures have come to play in the world of industry and commerce. In this direction the modern graphic arts are everywhere exerting a far-reaching and all-pervading influence. We are marking an era of pictorial advertising. Among the countless thousands of the people who nowadays run through the pages of the magazines or but scan the columns of the newspapers, great numbers turn with some special interest, or perhaps instinctively, for some new instruction, to the advertisements. Among these announcements, some of them beautifully and all more or less profusely illustrated, the picture part bulks largely, often enough the most telling part of the story. In fact, the advertising pages of our modern periodicals, including not only the popular magazines but also, and especially, the weekly and monthly trade journals that chronicle the progress of the industrial and mechanic arts, afford a more vivid panorama of modern life, and tell a truer story of the activity of our times than perhaps any other means can present. In these pages the business world, the real world of affairs as distinguished from the province of ideal things, is portrayed as it is nowhere else, and it is therefore little to be wondered at that advertising pays. That it does pay the mere fact of the great number of these periodicals and the extent to which they are utilised for advertising sufficiently attests, and it is not too much to say that it is mainly by dint of their pictorial contents that the advertisements, and incidentally the periodicals themselves, live and move and have their being.

In the feature of illustrated advertising the present age is altogether unique. The pictorial advertisement, whether in the form of poster, periodical, or catalogue, is almost wholly a product of this latter day. A generation ago the pictorial poster had not yet passed beyond the limitations of the pine board woodcut, coarse in line and crude in color, which served the purposes mainly of the travelling circus. It was only with the more recent development of the graphic arts that the picture poster gradually became what it is now, a means of publicity not only for the passing show, but of the activities of industry and commerce as well. By means of the modern graphic arts the poster has come to be a notable feature of this Pictorial Age, and quite often an expression of high artistic quality, contributing in this respect not a little to the educational influences of our times.

And there is the illustrated catalogue. Some of us are not so young but what we can remember the woodcut as an important factor in the business world. Commercial catalogues with woodcut illustrations had already attained a considerable vogue when the photo-engraving processes first began to cut a figure in the world. The woodcut had come out from its old time province of æsthetic art into the field of practical life and was making headway in picturing machinery and furniture and other products of industry, and in carrying the message of those things into the fields of commerce. It would doubtless have held its own in this direction against all encroachments of the photo-mechanical arts but for the incoming of the halftone reproduction and the marvellous perfection which this process has attained. But against the mystic forces of photo-chemistry and the facile processes of the camera the laborious efforts of the wood engraver strove in vain. The skilfully handled woodcut has, indeed, some qualities of marked distinction and a certain charm of its own, but the limitations of the work are such that wood engraving could never have filled the place which the photo-mechanical processes now occupy in the business world. It is only by means of these processes that the illustrated catalogue has come to play so large a part as it now does in our commercial life. The products of the camera, at once through their fidelity to Nature, their facility of production and their economy of cost, have widened the scope of the commercial catalogue far beyond its limitations of former days and made it what it now is, one of the most salient features of this Pictorial Age.

The advent of the half-tone process and the almost limitless capacity which this new agency of progress gave to pictorial art, while opening up new channels and directions for the printer's craft, at the same time demanded a more perfect mechanism of the printing press. Not only that, but the printing ink, and the paper as well, were exacted in higher quality and withal at a commercial price, and thus it has come about that all the mechanical accessories of the printing art have been called upon to follow, and step by step have followed, the evolution of this Pictorial Age.

This evolution is still in progress. We are only at the beginning of the Pictorial Age. The developments of the past are but an earnest of what the future has in store. With every new discovery in photo-chemical science, with every new improvement of the photo-mechanical processes, with every new advance of the graphic arts, the field for their application widens into new horizons. Every new process of pictorial illustration that has been brought to practical utility has but opened the way for new uses of the means already known. The uses of our art are infinite; its possibilities of usefulness extend into all those boundless ranges of modern life that are compassed by the printing press. And we that have to make the plates that go on the printing press that prints the papers that spread the pictures that make this Pictorial Age, we, who have this work to do, have but to do our part towards realising the endless possibilities of our pictorial art to win our share of the reward.

✓ *The Offset Method of Printing.*

By A. J. Newton.

From *The Swedish Book-printer's Calendar.*

To print on metal, such as tin or tin plate, which is largely used for placards and boxes, was found impossible in the usual manner, so that it became necessary to invent another method, and this led to the introduction of "offset": that is, the impression was first taken from the printing surface on to a rubber blanket and from that it was transferred to the metal sheet. This process has been in use since about 1875, and at least twenty-five years ago the same machine and process were used to print on paper and card, but as the amount of ink sufficient for metal was found insufficient for paper, the method remained in abeyance.

The revival of the method is said to be due to Mr. Ira W. Rubel, an American, who, noticing one day the perfect impression obtained from the set-off accidentally obtained from the impression cylinder when a sheet had missed feeding, thought the same process might be used in printing, especially on rough papers. He then set to work and invented a machine for the purpose, which was the first "offset" made for printing on paper. Since that time (1906) many machine-makers have turned their attention to the matter, and several machines are now on the market, notably the "Harris," the Potter, and the Hoe in America, the Mann, the Waite, the Furnival, and others in England.

The principle of all the machines is the same, viz.: the design on the printing surface, generally a zinc plate, is first printed from this on to a rubber blanket, and from that on to the paper that is to supply the edition.

The chief, in fact the only, real advantage of the method is that it enables unusual printing stock, such as, for example, rough and textured papers, linen, cotton, or other fabrics, to be used. Naturally all kinds of other advantages are claimed by enthusiasts for the method, or by those interested in the sale of the machines. Thus a very largely increased output is promised; but if this is attained it is due, not so much to the method as to the fact that the first machines have all been built as rotaries, and naturally any rotary machine is faster than a flat-bed machine; moreover, one of them, the Harris, is also fitted with an automatic feed attachment, which enables the speed to be enormously increased, so that it is stated to be possible to produce 7000 impressions per hour. At any rate, it is common to have work done by offset at from 1300 to 3000 per hour; and though this can be done on other rotary presses, it would be impossible to print on the same material that can be used with the offset at any speed whatever.

The great advantage of being able to use any sort of paper is strikingly manifest in the case of the printing of half-tone (autotype) illustrations, for the one great drawback to such illustrations has been the necessity to print them on a highly glazed paper, if one wanted a good result, which paper, besides being most unpleasant for the eyes, heavy to handle, and quick to spoil and wear out, is most inartistic in a book the text of which is printed on quite a different paper. The offset press will enable these illustrations to be printed on the same sort of paper that the book is printed on, or indeed the whole book may be printed in the same way, provided transfers have been made of the text. And this brings me to another point in regard to the present offset machines, and that is that they are all but one operated in the lithographic manner. In some respects this is of advantage, and in others the reverse. It certainly adds a complication to the machine, inasmuch as a damping arrangement must be fitted, and it necessitates the employment of highly skilled lithographic draughtsmen to prepare and lay down the transfers before the machine can be successfully operated. It is the inability to command this skill that has led to the disappointment of some purchasers of the machine.

The one machine that is not lithographic is the "Eureka," a German machine that is used to print newspapers having but small circulation, from the original flat formes. The impression is taken off on to the rubber blanket on a cylinder, and the same impression serves to print three copies on the paper fed from the web (roll). Naturally the last copy is rather fainter than the two earlier ones, but on the whole the machine must be counted successful; and where the standard is not too high, it will be of service to produce small editions quickly.

The offset process is as yet in its infancy, and a good deal of further progress can confidently be expected. The most serviceable improvements would perhaps be a further application of the method to letterpress printing machines; this should simplify the machine and also make the offset method available for an enormously greater mass of work.

The Greatest Customer of the Process Man, and how his Business may be Increased.

THE greatest supporter of the photo-engraver is the illustrated press, and, if only in the interests of business, the process man should join with all his power in the effort to induce the British Post Office to give better postal facilities to periodicals. If the same rates can be extended to all printed matter, including those catalogues and price-lists on which so much of our national commercial success depends, so much the better. The problem of the periodicals issued at greater intervals than seven days is well set forth in the following article from *The Agricultural Economist*:—

"The British Post Office makes a profit of between four and five millions sterling per annum, and hands this over to the Treasury. This system of using the Post Office as a medium for levying indirect taxation on the users of postal facilities has come to be adopted as a policy by both political parties. Every Postmaster-General appointed finds himself tied up by it. Whatever improvements are needed in our postal service the chief officials advise the Postmaster-General to contest, and, if possible, to refuse. In this way our Post Office has come to represent a warning example of the danger of running commercial and industrial enterprises as Governmental departments.

"I want to bring home to the minds of all whom I can reach the real meaning of this policy. Transactions which we see constantly occurring before our eyes are apt to become to us matters of course.

"But the policy is likely to be brought to the bar of public attention and discussion by the way in which it cripples the magazine literature of Great Britain. Journals published monthly have been selected by the postal authorities for especially onerous taxation. Dailies and weeklies are conveyed through the post at a halfpenny each, whatever the weight. If a paper be published fortnightly, monthly, or quarterly, the Post Office exacts, for conveying it, the full letter rates. Thus *The Agricultural Economist* has 2d. each to pay on every one of the 10,000 copies sent monthly through the post. This means indirect taxation levied upon our publication alone of about £700 a year. Of course the tax is passed on to our subscribers and advertisers in the shape of reduced advantages and increased charges, for a monthly paper must pay its way.

"The total effect on magazine literature is very striking. The United States Post Office charges all printed matter at a uniform rate of one cent—or one halfpenny per lb. The Postmaster-General there has recently proposed to increase the charge, and this has raised the whole question of postal charges and postal policy. By courtesy of the U.S. Postmaster-General I have received his annual report containing the official views of the question, and by courtesy of my enterprising confrère, Mr. Wilmer Atkinson, the editor of *The Philadelphia Farm Journal*, I have received his replies on behalf of the magazine press.

"One fact stands out clearly. The policy of cheap postal conveyance has endowed the people of the United States with a magazine literature compared with which ours is small and feeble. In Great Britain we have about 900 magazines published at intervals of more than a week. In the United States there are 5436. The circulations of our magazines run to a few thousands each; those of the United States run to hundreds of thousands each. Our monthly magazines are mostly charged from twopence to sixpence per copy. *The Farm Journal* of Philadelphia is delivered to 600,000 farmers throughout the States at a cost of a dollar for five years! That is to say, a paper of forty pages of instructional matter on all kinds of rural subjects can be had by a farmer, cottager, or working allotment holder at a cost of tenpence per annum.

"In the United States there are 788 religious magazines, besides 313 devoted to fraternal movements and 11 to charities. Education is equally well served. It has 122 magazines and 149 organs of educational institutions, besides 87 for literature, 23 for history and biography, 60 for science, and 61 devoted to juvenile literature. Commerce is served by 165 magazines, besides about 845 devoted to special industries. There are no fewer than 562 magazines devoted to farming, gardening, and their branches. The professions of law, medicine, army, and navy have 355 representatives in the magazine press. Every branch of philanthropy, of sport and recreation, of travel, of science, of temperance and other movements, is abundantly represented, and labor has 167 magazines of its own.

"Can anyone look at this list and consider the work these magazines are doing without feeling how suicidal is the policy upon which our own Post Office is run? It is not a simple question of the easiest way to raise a revenue. The problem involves the enlightenment and education of a people. The heads of the British Post Office mean well, no doubt, but they are unwittingly strangling the means of developing mental and material growth."

School Notes.

THE CHEMISTRY OF WET-PLATE WORK is the subject of a series of lecture-demonstrations at the Bolt Court School in its new Fleet Lane premises. The first was on September 27th, and it will be continued on Tuesdays through the session by Mr. A. J. Bull.

THE MANCHESTER SCHOOL OF TECHNOLOGY has just re-opened with a good syllabus in the printing, photo-mechanical, and photographic sections, under Mr. Charles W. Gamble, with Mr. R. B. Fishenden as chief assistant and a strong, thoroughly practical staff of men actually engaged in the trades.

THE L.C.C. SCHOOL OF PHOTO-ENGRAVING AND LITHOGRAPHY opened its new premises on Monday, September 19th, and Mr. Newton and the County Council are certainly to be congratulated on the thoroughly practical efficient way in which they have equipped the temporary place. Four storeys in Fleet Lane and two on the opposite side of the adjoining New Court have been adapted for the school's use so well that almost every department is quite as well, and in most cases materially better, situated than it was in the old Bolt Court building. The single exception to this is the art room, which is not so lofty and imposing as the old one, though comfortable and perfectly efficient for its purpose.

THE LEEDS INSTITUTE (Central Technical School) announces a good course of instruction in its photographic and photo-mechanical department, which has been equipped entirely by Hunters, Ltd., and which is staffed by Messrs. S. E. Bottomley, F.R.P.S., Guy Symmons, W. Garratt, H. A. Littlewood, and occasional instructors for various branches. The course includes:—Line and half-tone negative-making, elementary and advanced; color blockmaking; photo-transfer and photogravure; and the principles and practice of pure photography, elementary and advanced.

The prospectus says:—"The instruction in this section will consist for the most part of individual practical work. At the same time it is hoped that all students will take advantage of the various lecture courses of each section, which are arranged for the purpose of explaining more fully than is possible during the conduct of the practical classes the scientific principles and technical details of the various processes taught.

"The instruction is not intended to replace workshop training, but is *preparatory* and *supplementary* to this. It will also enable those who are engaged in one particular department of the craft to obtain a knowledge of the various allied branches which in the specialisation necessary in a modern workshop it is often impossible to obtain.

"The school thus provides every advantage and opportunity for those who wish to improve their knowledge of the business and dexterity in their own particular branch of the work.

"Although it is hoped students of the school will endeavor to get an all-round knowledge of the craft, yet every facility will be given for specialisation, and so far as possible individual attention will be given to the branch of the work of most service to each student."

Business.

THE ROTALITHOGRAPHIC CO., LTD., has been registered in London as a private company. Capital, £1000 in shares of £1 each.

THE CORKETT GRAVURE SYNDICATE, LTD.—Capital, £7500 in £1 shares. To take over the interests of F. T. Corkett in a secret process of machine-printed photogravure, for all the world except the British Isles, North America, Germany, and Austria-Hungary.

Specimens and so forth.

PHILIPSON, SON & SKILLETER have issued as a specimen a picture post card with a good line block of St. Nicholas' Cathedral, Newcastle-on-Tyne, on the back, and the following note on the front:—

"DEAR SIRS,—Line work, owing to its adaptability to all grades of work, is again coming into favor.

"We are able to assure you of a thoroughly artistic treatment of any subject, and trust that you can place with us any work of this kind you may have.

"Next month we hope to send out this same view reproduced by our special photo-litho process. Keep this for comparison.—Yours faithfully, PHILIPSON, SON & SKILLETER."

The specimen is printed on a thin buff card with a drawing-paper face, and is plate-marked. The idea of sending views of the same subject, reproduced in different processes, seems sure to attract the attention of customers.

Publications.

"DRY-PLATES AND COLOR-FILTERS FOR TRICHROMATIC WORK," written by R. James Wallace, and published free of charge by the G. Cramer Dry Plate Company of St. Louis, is a booklet that means much to the photo-mechanical craft in America. It means the successful result of a very large amount of trained ability applied to certain of their needs. It means simplification and standardisation of one of their most important departments. It means the offer to every man and every firm of results which could only have been obtained otherwise by each one going through the lengthy and expensive course of investigation, or paying a fancy salary to someone who had done so. There should be no hesitation in asking for the booklet and in putting its claims and statements to the practical test.

Brevities.

ELECTRIC ETCHING is foreshadowed as the next great step in "process" by *The Plate-Maker's Criterion.*

THE BECK ENGRAVING Co., Philadelphia, will move into its new building at the corner of Sansom and Seventh Streets on 1st November. It claims to have there "the most perfect equipment and facilities in America."

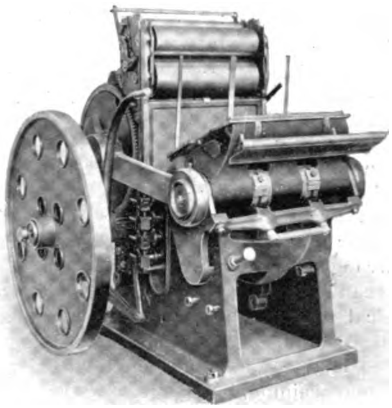
"LONDON HALF-TONES" is the caption of an article in *The American Printer*, which pays a tribute to "the exquisite care observed in some of the plate-making done abroad," and illustrates it with a couple of large half-tones of landscapes produced by Carl Hentschel, Ltd.

SOME MOST IMPORTANT TESTIMONY in the Levy-Hunter case is given in the evidence of Professor Boys, on another page of the current issue. The case, in spite of its great length, is by no means dry reading for those familiar with and interested in the craft, and some of the matters brought forward would form useful subjects for discussion at a club of process men.

PER-INCH CHARGES FOR METAL.—It seems that some of the Canadian and American supply-houses have been considering the idea of charging zinc and copper by the square inch instead of by the pound as at present. The executive committee of the Photo-Engravers' Association invited representatives of these houses to meet them in Toronto at the Convention on September 4th and following days, to discuss the idea.

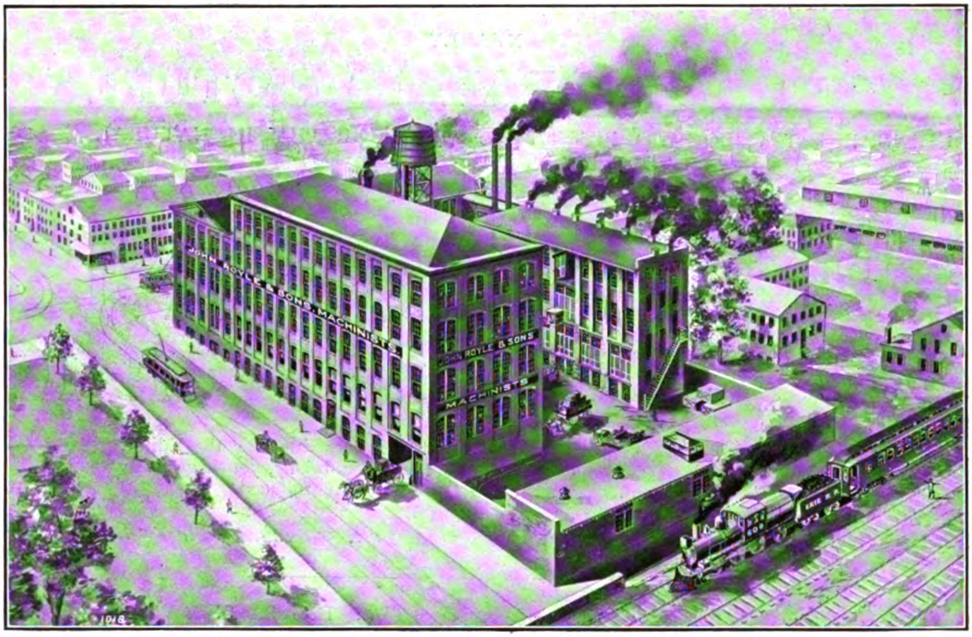
THE VALUE OF A STOCK-ROOM in a photo-engraving house has been demonstrated by the Powers Engraving Company, New York, who recently established such a room, and who report to *The Inland Printer* that it has already accomplished a saving of $200 (£40) a month in supplies. They have a stock-room which looks like a country store, with ample shelves, drawers and receptacles to keep the several hundred different articles required in photo-engraving, as well as the art department. This stock-room is in charge of a regular clerk, and nothing is delivered from it without an order from the person using it. Each photographer, for instance, is charged with the amount of silver and iodine he uses, and so with the other supplies, so that it is easy to determine who are the wasteful ones. Supplies can be weighed and tested in this room, which prevents any fraud in the quality of the goods purchased. This stock-room has already paid for itself.

THE BEST PRESS is none too good for the printing of half-tones, and in a very handsome catalogue issued recently an attempt is made by Hunters, Ltd., to convince the reader that the "Brilliant" platen press is one of the very best. It is a good catalogue, explanatory, illustrated, and giving proof of its contention by fine examples of the work done on the "Brilliant," and the press itself will fully bear out the claims made for it. Testimonials are given by two process engravers and two printers, and one of the specimen jobs is a half-tone illustration in three printings of the Arc Gear process camera.



THE NORWICH FILM, a fine toothed-surfaced, transparent material for the making of original drawings, is now on the London market in the hands of Lefranc & Co., 27 Fetter Lane, London, E.C. It is described, with technical instructions for using it and for reproducing the drawings, in a booklet that will be sent free by the manufacturers of the film. Its greatest value will be to lithographers; photo-engravers who make originals will find it useful, all draughtsmen and designers should know of its qualities, and even the photographer who wishes to modify parts of his negative should find it very helpful. It can be used instead of transfer-paper, and has many minor uses.

INDIAN EXPERIENCE.—Mr. Alphonse Audy, who was in England early in the summer, mentions some of his experiences and tests in reply to one of our letters. He says:—"I have given the Thames Color Plate a good trial and



The Factory of John Royle & Sons, Paterson, N J.

find them very easy to use (separate method). I used rytol for development before leaving India. I use the 'Metzograph' screen for tri-color block work and feel convinced that in conjunction with some of the plates like the 'Thames' Autochrome, etc., this metzograph screen will prove invaluable for reproduction either for block work or lithography. The success in obtaining perfect negatives seems to lie in getting the metzograph screen as close as possible to the sensitised wet plate when making the exposures and in using a thin enamel when printing on metal. I find that most dark slides do not allow the plate to approach near enough to the screen, therefore it is better to place the screen and sensitised plate direct in the dark slide, separating same by means of strips of cardboard or rubber bands."

Mr. Audy is one of the regular readers of *The Process Monthly*. We shall always be glad to have little notes on practical points from other readers.

THE FACTORY OF JOHN ROYLE & SONS at Paterson, N.J., should be a source of some pride to photo-engravers, since it has been very largely built upon their demand for excellent tools. Most of the Royle machines are unique and cannot be compared with others, but where comparison is possible it will usually be found that the Royle price is the highest in the market. Probably the Royle sale is also by far the biggest, which indicates that process men are prepared to pay for what they believe to be the very best obtainable. The factory is always open to those who are interested in the machines it produces, and while every department is worth a visit, two in particular must strike the stranger. One is the great showroom, where every machine may be seen and tested in actual work, and where the differences in capacity between the various sizes and patterns can be demonstrated. The other is the experimental branch, where some very complex mechanical and engineering problems are always in course of attempted solution, for the Royles are not content to modify slightly here and there, but are ever on the lookout for some entirely new principle or design that will lead to efficiency or economy. Their theory is that good machinery is the cheapest thing in a workshop, while time and space are the dearest. Therefore, they are willing to add 100 per cent. to the cost of a machine if it will save 10 per cent. or 15 per cent. in time or materially improve the quality of the work. And their factory, which we illustrate from a recent view, is evidence that the theory is sound. The factory itself is a most efficient tool.

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Edited by H. SNOWDEN WARD, F.R.P.S., Founder of *The Photographic Monthly.*

The Sensitising of Bitumen.

By Dr. Edw. Valenta, in "Photographische Korrespondenz."

As obtainable commercially, ordinary bitumen of Judea is comparatively insensitive to light, and various methods have been from time to time announced as increasing sensitiveness. Some of these processes are based on the varying action of solvents on the three constituents α (alpha) β (bêta), and γ (gamma), and especially on the action of ether, which only dissolves the constituents α and β and leaves as residue the constituent γ, the most sensitive.

Another process, which I described in 1891, and which might be called "sulphuration of bitumen," consists of incorporating sulphur with the bitumen in such a way as to transform the constituents alpha and bêta while forming gamma, either by the fusing of a properly combined mixture or, preferably, by prolonged boiling of this same mixture in a vessel having a cooling worm, with a solvent which boils at a high temperature.

The two phases of the transformations allow, on one hand, the formation of γ-bitumen precipitated from β-bitumen—

$$\underset{(\alpha\text{-bitumen})}{2C^{32}H^{46}S} \quad + \quad \underset{(\text{sulphur})}{S} \quad = \quad \underset{(\beta\text{-bitumen}),}{C^{64}H^{92}S^{3}}$$

then the formation of γ-bitumen from β-bitumen, this second phase causing the release of sulphuretted hydrogen.

$$\underset{(\beta\text{-bitumen})}{C^{64}H^{92}S^{3}} \quad + \quad \underset{(\text{sulphur})}{5S} \quad = \quad \underset{(\gamma\text{-bitumen})}{2C^{32}H^{42}S^{2}} + \underset{(\text{sulphuretted hydrogen}).}{4H^{2}S}$$

This method releases a considerable quantity of sulphuretted hydrogen (about 300 litres in 1 kilogramme of crude bitumen treated), but is none the less much superior to the method of dry fusion, by which it is impossible to avoid partially carbonising the bitumen. To use, we dissolve the bitumen and sulphur (this last being twelve grains to the hundred of bitumen) in a still, and allow it to boil until no more sulphuretted hydrogen can be released, which generally takes from three to four hours. The excess of the solvent is then distilled and the residue dissolved in twenty-five times its volume of benzine to form the sensitising solution to be spread on stone or metal.

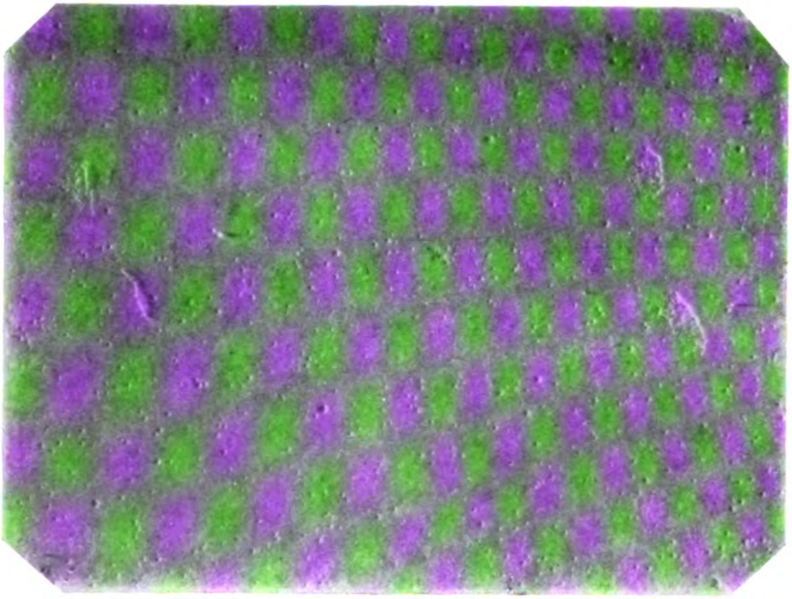
If the process is carefully conducted, the result thus obtained is of comparatively considerable sensitiveness, but the preparation should be carried out with many precautions; if not, there is a risk of obtaining a perfectly insoluble result. Further, during the distillation the bitumen tends to carbonise, to the great injury of the quality of the final product; also the release of sulphuretted hydrogen makes it necessary to conduct the operation only in a very well ventilated apartment, and the use of this process is far from being agreeable in manipulation, and that is doubtless why it is rarely undertaken.

Bitumen being used in large quantities in the various reproducing processes, either purified with ether, which is expensive, or in the rough state, it was interesting to discover if possible a simpler method giving the same increase of sensitiveness as sulphuration. Starting with the fact, well known in industrial chemistry, that a large number of hydrogen compounds heated with chloride of sulphur replace a part of their hydrogen by sulphur at the same time that hydrochloric acid is released, I was led to choose as a solvent carbon bisulphide, which easily dissolves both the crude bitumen and the final product without in any way reacting on the chloride of sulphur. The experiment proved that the reaction took place at a relatively low temperature. By heating with chloride of sulphur and bitumen dissolved in carbon bisulphide, the release of hydrochloric acid is very rapid and the reaction is finished in a short time.

If an excess of chloride of sulphur is used it appears that the gamma-bitumen is in its turn attacked, the whole of the bitumen becoming insoluble and consequently useless. A careful series of experiments has determined the proportion of chloride of sulphur to use in order to obtain a highly sensitive preparation containing only a relatively negligible quantity of insoluble matter; the best proportion is from six to eight of chloride of sulphur to the hundred of bitumen.

The apparatus consists of a glass retort about $1\frac{1}{2}$ litre, united by a cork stopper (excluding all connection with rubber) to a worm or some other condenser; the retort is heated in a water-bath. We place in the retort 100 grammes of pulverised bitumen of Judea, letting it dissolve in 500 to 600 c.c. of carbon bisulphide. After complete solution we add, by small amounts at a time and vigorously shaking after each addition, about 6 to 8 grammes (or from 4 to 5 c.c.) of chloride of sulphur previously diluted with at least 20 c.c. of carbon bisulphide; fastening, then, the retort to the condenser, the water-bath is heated until the contents of the retort begin to boil (about 50° C. or 122° Fahr.); hydrochloric acid is released and a little sulphuretted hydrogen. Distillation is carried on until about a third of the carbon bisulphide is evaporated. If at this time the distilled liquid is clear and contains no more hydrochloric acid, the operation is stopped, the contents of the retort are poured into a bottle of proper size; then we add 2 litres of benzine, after having by means of this benzine rinsed the retort several times to prevent any loss of bitumen. The solution thus obtained should be filtered; it is then ready for use. For lithographic work add to it about 2 per cent. of essence of lavender. The sensitiveness of the resist obtained on zinc or steel is almost comparable to that of a bichromated albumen resist, good results being often obtained in three minutes in full sunlight under a line negative. The images are developed in pure spirit of turpentine or with the addition of naphtha, which in the case of thick resist has been found necessary. This new preparation has been used with success in the Imperial Photographic Institute at Vienna.

("The Process Photogram.") November 1910



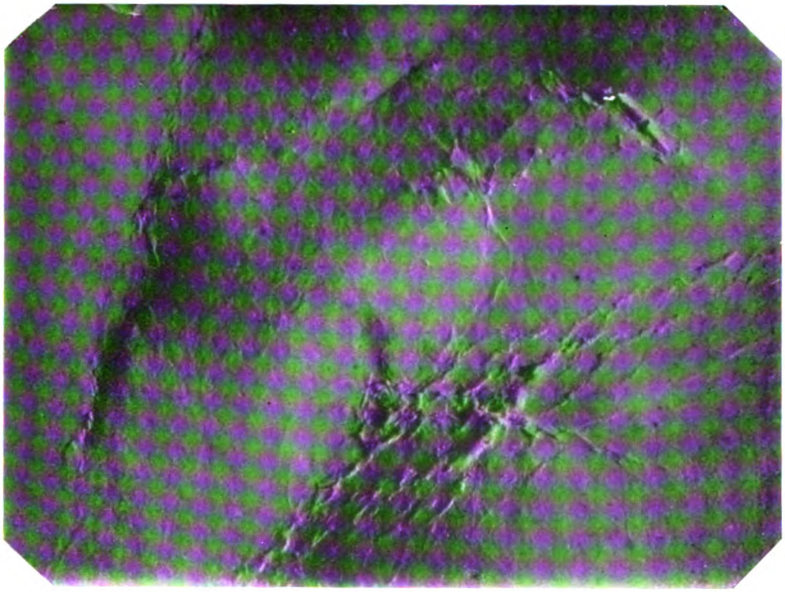
Photomicrogram (enlarged 11 diameters) showing the inequalities of surface on a *cheap* art paper.

The Qualities of Coated Papers in Relation to Half-otne Work.

By Harry A. Maddox.

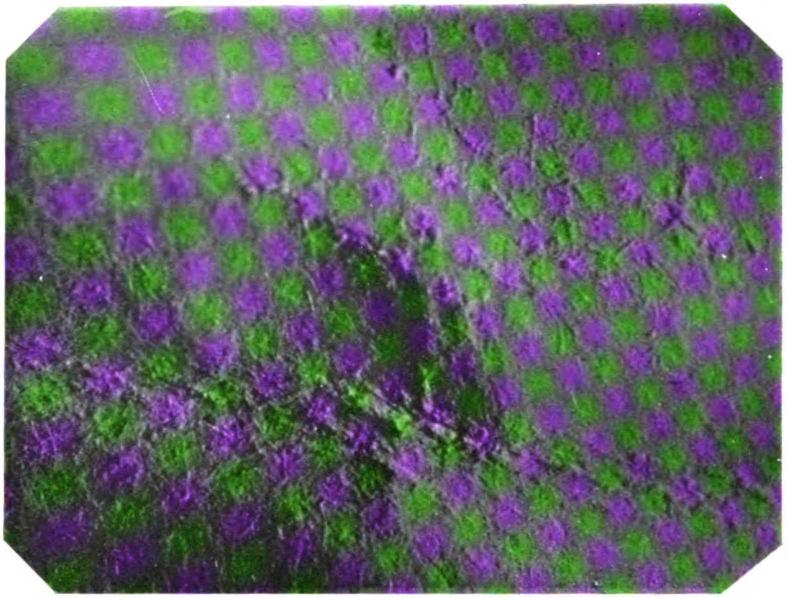
Since the introduction of half-tone blocks, coated or art papers have been a firmly established commodity. Necessarily so, since the ordinary fibrous surface of even the most firmly crushed or rolled stock is quite unfitted to correctly reproduce the delicate structure of the process plate. To give the desired effect in printing, every projecting point constituting the whole should be perfectly rendered. This is impossible by ordinary methods except upon a perfectly plain flat surface; and even here much depends upon other factors, principally the ink. With a hard ink the dots are clear, sharp, and even in opacity. The use of hard inks is debarred under ordinary conditions of printing. If the ink is too soft, the dot is represented by a grey centre with the ink squeezed to the edges. Values of tone are entirely lost, and the general effect is dull and lifeless.

To revert to the coated or clay surface of art papers, the quality of the clay is the main factor in producing a uniform face, free from any irregularities. Three qualities of mineral are used, either mixed or separately, and the quality of the coated stock is dependent upon which class of material is used. The cheapest and most largely used is China-clay, whilst for the higher priced art papers calcium or barium sulphate is used. Whatever the mineral may be, it is, of course, mixed with glue to form the solution for coating the web.



Photomicrogram (enlarged 11 diameters only) showing the effects caused by a kink on art paper, such as occurs in many parts of the surface, on careless handling of the stock.

China-clay contains impurities, and these occur on the surface of the finished paper. They are not visible to the naked eye, but nevertheless they are sufficient to greatly detract from the printing qualities of the stock. The photograph is enlarged eleven diameters only, and shows plainly the difficulties which have to be faced when working for cheapness. To obtain an intelligent grasp of the constitution of the ideal printing surface, it is necessary to understand the structural properties of these mineral substances. China-clay is a larger and coarser precipitate than either calcium or barium sulphate, and contains sandy or siliceous matter, especially in the cheapest grades. Calcium sulphate (pearl hardening) is an exceedingly fine precipitate, beautifully white, and capable of forming a perfectly compact surface. Barium sulphate (heavy spar) is prepared artificially, and is of much the same nature as the pearl hardening. The value of the two latter materials lies in their brilliancy of color, freedom from grit and impurity, and the property of conferring compactness of surface, due to the microscopical smallness of the particles. With the use of these higher quality minerals we obtain a perfect printing surface for even the finest screen half-tones. Equally as important as its superiority for rendering fine detail is its capacity for drying. It will be well to consider this point when the offset enthusiasts speak of the abolition of coated papers. When we observe how beautifully such surfaces lend themselves to the exacting drying conditions of speedy three-color work, it is somewhat difficult to realise an efficient drying non-coated paper. Having dealt with the value of the surface, it becomes equally important that some attention be paid to the nature of the fibrous material constituting the body paper. One of the chief points in a coating is good color, but this quality is neutralised if the paper itself is made from such an inferior material as mechanical wood pulp. Unfortunately it is a fact that the cheapest grades of art papers contain a fair percentage of this deleterious fibre. The foreign matter and impurity from the tree remain to a large extent in the ultimate pulp, and eventually



Photomicrogram (enlarged 11 diameters only) showing the results of a kink on an imitation art paper.

play a most important part in destroying the color value of the surface. This speedily happens on exposure to light and air. The best fibre is esparto, either by itself or mixed with soda wood pulp. From these sources a mellow body paper is obtained, which gives good handling properties to the finished coated stock. It is well to consider the body paper if anything like permanent printing and folding is required.

Any art paper will crack to some extent on folding. If the body is of a mellow, yielding fibre, the result will be far superior to a brittle body paper. Mechanical wood pulp is an exceedingly brittle fibre, and here again helps to destroy the efforts of blockmaker and printer. To detect the presence of this injurious constituent there is no better reagent than a solution of phloroglucinol hydrochloride, which creates a deep red stain when poured on to a paper containing mechanical wood. Owing to the difficulty of selecting a good "art" by appearance only, it will be well to run over the chief points of value. The color should be pure white, free from specks, either grey or black. The feel should be free from brittleness, and yet possess a good rattle, not soft nor leathery. Hold the paper to light and observe the appearance of the look-through, which should be clear, clean, and of even translucency. The coating should be firm and not come off on the moistened thumb, whilst there should be an absence of smell.

The last point is that of handling the stock; and it is probably one of the most important. Careless carrying of the reams results in kinks, cracks, and fractures which ruin the finished appearance and create lots of trouble on the machine. The particles of clay become loosened, find their way into the interstices of the half-tone block, and neutralise the value of the tones by blurring. This is a frequent offence, and often through an unnoticed cause. The photographs 2 and 3 are of ordinary kinks, eleven diameters magnification, and show well the difficulties ready for the printer. This is no exaggeration of the defect; but is just a picture of the results of careless handling of such coated stock.—*Swain's Quarterly, to whose courtesy we are indebted for the illustrations.*

√

The New Rotary Photogravure: The Mertens Process.

THIS process of rotary intaglio printing for newspapers seems to be moving apace. We have received another issue of the *Freiburger Zeitung*, containing some more illustrations, which are a decided improvement on those in the special edition published last Easter. The pictures show greater brightness and vigor; the wiping of the printing cylinder is evidently done more cleanly; and the shadows are soft and velvety, whilst the detail is extremely sharp. The screen effect is not visible to the naked eye, and the pictures look much more like photographs than photomechanical images. The subjects are sufficiently varied to show that the process is capable of dealing with all kinds of pictures.

A lecture by Herr Max Ortmann, delivered at a general meeting of the German Printers' Association and reported on one of the sheets, describes the process of Dr. Mertens very fully. Herr Ortmann says there is at present only one of these rotary intaglio machines for newspaper work, and it is installed in Dr. Merten's place in Freiburg, where it is being daily demonstrated. Further machines of improved construction are being built at Freiburg as quickly as possible for the publishing house of W. Vobach & Co., Leipzig; for the *Fremdenblatt* newspaper at Hamburg; and for the *Freiburger Zeitung*, as well as for other firms who are on the point of deciding to take up the process.

The process of coating the roller with bichromated fish glue is performed as described and illustrated in our August issue, p. 184. This operation takes somewhat less than half an hour. This process of coating is the invention of Mr. Rollfs, the former partner of Dr. Mertens.

The printing of the image on to the roller is done by attaching to the roller film positives made from half-tone negatives. To locate the correct position a cut-out mask of the shape of the type form is applied to the roller, and the films transferred in the openings left for the cuts. The films readily adhere to the roller. The image is developed by working out the soluble parts of the image, just as in the case of a fish-glue print on the flat plates made by the photoengraver. Then the roller is dried in a few minutes by means of a fan. It is now ready for etching. The films, after being stripped off, can be preserved for further use if necessary.

The cylinder is put in an etching bath of weak acid for about five minutes. After this it is carefully rolled up with a smooth lithographic leather roller charged with a specially prepared varnish ink, so that the very finest points of the etching are closed up. A second short etch follows, after which the cylinder is again rolled up and further etched. This rolling-up and etching is done several times until the full depth required for printing the blocks is obtained. It will be seen that the process differs from the usual fish-glue process where the image is burnt in, as it has not been found practicable to do it in that way. Of course a cylinder covered with several pictures is etched in almost as short a time as a single picture would be.

As soon as the etching is finished the cylinder can be put in the printing machine and the printing started without any making-ready.

The printing machine is of very simple construction. Under the printing cylinder is a wooden ink roller dipping in a trough of ink, its upper part being in contact with the printing surface. On top of the printing cylinder is a rubber-covered impression cylinder. The "doctor" blade is made of an alloy of certain metals, and is of about 2½ mm. thickness by about 10 cm. in breadth. It is longer than the image-printing cylinder, and has a continuous movement sideways to and fro. After being in use for some time the "doctor" has to be taken out and its edge repolished on an oil stone. Whilst this is being done a duplicate blade may be put in the machine to prevent delay. It takes no longer to put in a "doctor" blade than to insert a reel of paper in a printing machine. In order to render unnecessary the taking out of the "doctor" for sharpening, Dr. Mertens has invented an arrangement for automatically sharpening the edge whilst it remains in the machine.

The ink used is very much like ordinary printing ink, only thinner. It is wiped off the surface perfectly clean by the "doctor," and the surplus thus removed is returned to the ink trough. Through the co-operation of a leading firm of ink manufacturers, an improved ink very suitable for intaglio printing has been made, and it has the advantage that it does not set off.

The elastic impression roller is pressed into contact with springs. This roller is geared to the printing cylinder, and it is considered that this is an important advantage, as cylinders of any diameter can be then used in the same machine within the limit of its capacity. The distance of the impression cylinder from the printing cylinder can be regulated, which is useful when starting the printing.

The coupling up of the intaglio printing machine with the ordinary newspaper rotary printing machine is readily done, and the register is attained by means of an ingenious register wheel. By simply turning this with a hand wheel the register is adjusted within a fraction of a millimetre.

As regards the question of preventing set-off, any means which are taken on ordinary printing machines can easily be applied to the intaglio printing machine.

The damping of the paper beforehand has been thought to be one of the disadvantages of the process, but Herr Ortmann thinks it is really an advantage, as much richer prints are obtained, and there is a distinct saving of ink. Moreover, dry paper is often dusty. The damping is easily done by means of a single-roller machine, and the operation is performed the day before use. Experience shows that 5 to 6 per cent. of moisture gives all the desired advantages without giving rise to any difficulties. The damping machine can be regulated so as to give any required degree of moisture.

Herr Ortmann is personally of opinion that the damping can be dispensed with if the paper for intaglio printing only receives part of the care which is generally given to the paper for half-tone printing. In proof of this, a representative of the *Vossische Zeitung*, who came to Freiburg to see the process, brought some paper with him for trial, and it printed splendidly without any damping, as it was particularly suitable for intaglio printing.

Speaking of the artistic advantages of the process the lecturer points out the gain in gradation, detail, and tone value through printing in the intaglio way, by reason of the fact that the delicate tones are etched lightly, whilst the dark tones are etched deeply, and the rubber-covered impression roller causes the paper to be forced into the gradations of the etched plate. In half-tone printing the ink can only be applied in small quantity if smearing is to be avoided, whereas in intaglio printing the ink is applied according to the production of the picture. The peculiarity of intaglio printing is that it will allow even of water-colors being used.

In regard to the paper the lecturer points out that the present aim of the half-tone printer is to use matt papers, and the necessity of using highly glazed papers is a bar to the application of half-tone to newspapers. Where half-tone printing stops, intaglio printing begins and gives us matt pictures on ordinary news papers. One of the most prominent paper experts writes very significantly that we are on the verge of a new era in the printing art, and a tremendous revolution will be caused. Highly glazed papers will disappear altogether, and in their place will come matt paper, which will appeal to the eye of the reader. In future we shall not have any more soft and breakable paper, and no more perishable newspapers and books. Books will last longer, as the paper will not be squeezed under the enormous pressure of calendering, and the paper will be better, because the fibres of the paper need not in the future be so short, which, at present, is the primary condition with paper for half-tone printing. Paper manufacturers will be glad to be enabled to again make paper of long fibre, which will not require to be heavily calendered. From an economic point of view it will be an advantage to use unglazed paper, as the material thus becomes cheaper. Besides, the paper can be lighter in weight.

A further economic advantage is the increased speed of intaglio printing and the absence of making-ready. It has been calculated that the saving in the latter respect will be sufficient to write off the cost of the machine and the licence.

In the same issue of the *Freiburger Zeitung* an account is given of the further advances made in the Mertens process. The electrically deposited copper coating on the iron cylinder is now dispensed with. The Elmore Company, which is associated with the German Mertens Company, has been able to furnish a copper sleeve of only a few millimetres thickness, which by means of a very ingenious and simple machine is drawn on to the iron mandrel quite evenly, and thus serves the same purpose as the electrically deposited coating.

A further important improvement is a means of registering the printing cylinder of the intaglio machine with the plate cylinder of the newspaper rotary.

The removal of the copper sleeve after printing is not necessary, as the depth of the etched image is so slight that it can easily be removed by polishing so as to make the surface ready for another etching. The consumption of copper, owing to these improvements, is so small that it is hardly worth considering in making calculations on the cost of production. It is further possible, when only a small picture is to be printed, to use a short length of the copper sleeve on the mandrel.

The speed of the intaligo printing in connection with the rotary newspaper machine has been brought up to over 12,000 revolutions per hour without any difficulties developing themselves in the printing, and without the quality of the printing suffering. A new position which has been found for the "doctor" enables it to work just as well at the 12,000 revolutions of the cylinder as when going more slowly. The ink is also just as surely lifted by the paper. The setting-off of the ink has also been entirely avoided. A firm of ink-makers who have co-operated with Dr. Mertens have succeeded in making an ink which on account of its quick drying gives no set-off difficulties.

It is stated that the half-tone positive films used for the printing of the images of the pictures in this special number of the *Freiburger Zeitung* have been made by Brendamour, Simhart & Co., of Munich and Düsseldorf, a well-known process firm. This fact seems to prove that there is nothing special about the films required by Dr. Mertens, and they can no doubt be produced by any half-tone process house.

Another piece of news about this process is given in the *Deutscher Buch und Steindrucker*, which says that a new process of rotary intaglio printing is about to be introduced by Mr. Samu Herbst, of Budapest, notwithstanding that this gentleman lost in an action brought against him some time ago by Dr. Mertens. In reference to this announcement the German Mertens Company write that Mr. Herbst's process probably follows the well-known process which is based on textile printing, and has nothing to do with the newspaper intaglio process which Dr. Mertens is developing, so that Mr. Herbst is welcome to carry out his process if he has attained something good after his long striving in this direction.

It is also announced that the firm of Kempewerk are about to put on the market an intaglio quick-printing press of their own construction.—Condensed from *The British and Colonial Printer and Stationer.*

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Lithographers and Photography.

If we consider the spread of photography in general to-day and its application to the most manifold fields, we see that it has become an invaluable assistant, not merely for science and art, but also for technics. This helping activity on the part of photography is, however, still merely beginning its course, and it is the duty of every progressive man to ask how he can make use of it for himself.

The printers have gone ahead as breakers-up of the way and have won for themselves a field of immense extent.

As the years went on, the larger printing and publishing firms added to their plants a department of this kind, and to-day every prominent establishment that wishes to increase its capacity bends its aim to set up an effective section for reproduction. In this way the printing press has won fields that formerly offered a rich harvest for lithography. They were not won without toil. This development was not the work of a single night. It required steady perseverance to bring the thing to the height which it has to-day reached. Many a sacrifice of money and labour was necessary to attain the greatest possible perfection. By applying all the new ideas in this line that were not fit for use, the printers have captured a vantage ground from which they cannot easily be driven.

The printers in every direction took up with success the reproduction of illustrations, and kept pushing on farther and farther, and it is singular that lithographers in the meanwhile calmly stood still and let themselves be outdistanced. Was it carelessness, or was it an underrating of the process; or did they suppose that they could offer no worthy parallel for this whole movement? Probably all three things had to do with it. Certainly the inactivity of years points to this conclusion.

If lithographers had taken up the advantageous employment of photography for reproducing illustrations at as early a date as printers did, we should certainly see to-day a much more effective method of reproduction in their department. Within the last few years a few establishments have decided to introduce this use of photography, and have obtained very remarkable results that have certainly not proved a loss to those who undertook the matter.

One caution is not to be forgotten. It would be absurd to try to reach at once such perfection in the reproduction of colored objects as we to-day find in printing establishments, if we limited lithography in the same way as to the number of colors. Such a limitation would show a complete misconception of the two departments.

Lithography works, as is well known, with a number of stones in order to effect rich tones of color. It begins with fully covered surfaces and prints in light colors. Then it gradually limits the printing surface and deepens the colors in the following stones, thus giving to the production an advance from light tones to the strongest outlines. It is not uncommon for lithography to place twelve and more colors before us. The more colors there are, the easier is the work, as a matter of course, for the workman. The fewer the colors, the more carefully must the single color stones be wrought out in the tones as shaded off. But it is not a matter of indifference for the striking off, whether there are few or many stones. For every color raises, of course, the number of imprints by the whole number of the edition. It is therefore desirable to limit the number of colors.

When a number of stones are used, the colors do doubtless acquire a certain repose, but at the same time they are in danger of drowning each other.

In a sharp contrast to the lithographic method of reproduction, the color print produced by photography preserves the aim of reaching the most complete effects in the shades of colors with the fewest stones, and it is precisely this aim that can be so useful for the engraver on stone. The dissecting of the tones of color can by the present exact methods of work be far more perfectly effected by photography than by hand, and therefore a small number of stones is needed.

At first, when a lithographer works from a plate produced by photography, it often happens that he does not make the most of the drawing that has been gained. This error can soon be cured if he has a proper guide. Of course this presupposes a fully instructed director. For this purpose it is necessary first of all that those who intend to take up the direction of such a process should imbue themselves completely with the practice and the theory of colors, and at the same time with all the working possibilities of photographic reproduction.

Some firms (and they were not small firms) that I know of personally, have made attempts to introduce the use of photography, but did not succeed in advancing beyond the first steps. The cause of the failure was in each case to be sought in the lack of practical knowledge on the part of the director.

The photographer who is engaged to prepare the photographic part of the work may be an excellent operator in the different methods of procedure, and the work that he does may be of the most perfect description, yet nevertheless it may be unavailable for the lithographer, because he does not know how the further process is to be carried on. The lithographer, on his part, is sensible of certain defects, but he in turn does not know what the photographic possibilities are.

The director of the plant must be in a position to give the needed practical instructions, both to the photographer and retoucher and to the lithographer. If the direction rests in hands that command thorough knowledge and experience in these important fields, failure is impossible. For photography, with its great power of adaptation, admits of a most manifold application for lithographic purposes, both mercantile (pen and graving tool) and chromo (chalk and pen), direct or indirect.

Special service can be offered to lithography by the photographers who, before taking up photography, busied themselves with success in the various branches of lithography, and especially in chromolithography. Such men bring with them a rich treasure of the necessary preliminary knowledge which is of important advantage for the whole procedure. For a man who has studied thoroughly the manifold methods of work in photography in relation to lithography is in a position to open up new ways for it, even outside of the sphere of printing in colors.

Proprietors who understand how to fit out their establishments with the advantages of photographical reproduction, and to win for the direction men capable of preparing lithographers for this branch of the work, will doubtless be able in a very short time to come forward with entire success and gain a long start ahead of the rest.—Condensed from *The National Lithographer*.

The Valentin-Zerreiss Method of Half-tone.

(*Concluded from p.* 239.)

"FORMATION OF SCREEN ON THE FIRST LAYER.

"As will be seen, the screen is constituted by the following entirely opposite elements:—

"1. Square elements distinctly transparent; and

"2. Elements opaque at their geometrical centres, the opacity decreasing from the centres to the circumference.

"When a screen is produced on the first layer by exposure of the screen, there will be produced on the whole surface of the plate a positive image of the screen; that is to say, there will be formed on the said surface square elements distinctly opaque and square elements transparent at their geometrical centres and decreasing in transparency from their centre to their circumference; the said decrease being, however, only slight, so that finally there will be a great difference between the opaque squares and the adjoining ones.

"It is necessary to take into account, in the formation of the screen, another factor: the opposition between the transparent squares and the opaque squares of the screen being very great, the limit marking the difference of exposure will follow distinctly a line, only provided that the thickness of the sensitive layer is zero. But in reality that is not the case, and there will be formed a well-known irradiation phenomenon (figs. 8 and 9).

"In fig. 8, *g* is the screen, *e* the thickness of the first layer, and *l* the source of light. Fig. 9 is plan of fig. 8.

"A slight additional exposure outside the periphery of the opaque square which will reinforce the point on the whole of its circumference following the outline *n*, and the plate will show, after the development and drying, a screen layer which will have different degrees of exposure which will be equally repeated on the whole of its surface, at each geometrical centre of the points which divide it up. A copper plate provided with a screen will therefore be formed, which will present, if submitted to the action of a mordant, a very great sensitiveness, and will be capable of undergoing that action with a very special precision. This sensitiveness can be graphically illustrated by figs. 10 and 11.

"In fig. 10, *e* represents the first layer, the different thicknesses of *e* represent the different degrees of exposure. The dotted lines indicate the action of the etching in accordance with the different degrees of exposure.

"Fig. 11 is a plan of fig. 10, which shows the different degrees of resistance to the action of the acid, due to the different degrees of exposure. Thus, the portion M will offer the maximum resistance for a certain time, after which it will crack. The portion N will have a resistance between the resistances M and P. The portion P will have a resistance decreasing from N to Q. The portion Q will have no resistance, and will be attacked as soon as the mordant has passed through the second layer. If, on the other hand, the distance R separating the geometrical centres of the resisting points of the layer is varied by the use of different sizes of screen, it will be seen that if R increases, the scale of existing sensitiveness between two adjoining geometrical centres spreads and reduces the number of portions sensitive to the action of the mordant; whilst, on the contrary, if R decreases, the number of sensitive portions increases. At the limit, that is to say, when R becomes infinitely small, there will be obtained on the metal plate a layer having such a constitution that each of its points will present a complete sensitiveness to all the tones, and the action of the mordant, regulated by the sensitiveness of the said layer, will produce on the metal plate an engraving which will reproduce, by its different recesses, all the fine-tones and all the half-tones of the subject.

"PREPARATION OF THE SECOND LAYER.

"As soon as the plate provided with a screen has been developed and dried, it is covered with the second layer, which is put on the whirler. As soon as it is dried, it is exposed under the positive print or original of the image to be engraved, and after a suitable exposure, which varies in accordance with the subjects, it is ready to be engraved.

"ENGRAVING.

"As already stated, the constitution of the screen on the metal plate is suitable for good prints or originals; that is to say, practice has shown in that case, for the constitution of the first layer, the use—

"1. Of a screen of the shape shown in fig. 4.

"2. Of a solution of the following formula: Water 500 grains, bichromate of ammonia 12 grains, gum arabic 110 grains, sugar 8 grains, and ammonia 9·9 drops.

"In these conditions, the etching is effected normally by the use of a solution of perchloride of iron of 45° B. in the following manner:—

"For facilitating the explanation it will be assumed that the print or original to be engraved consists of six different tones represented by the diagram of fig. 12, the different thicknesses of which represent

Fig. 1.

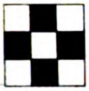


Fig. 2.

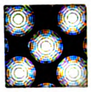


Fig. 3.

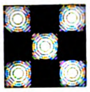


Fig. 4.

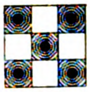


Fig. 13.

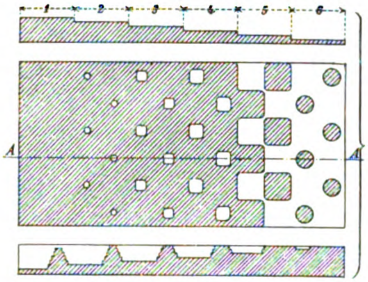


Fig. 8.

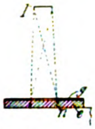


Fig. 5.

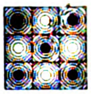


Fig. 6.

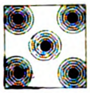
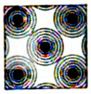


Fig. 7.



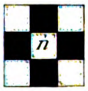


Fig. 9.

Fig. 12.

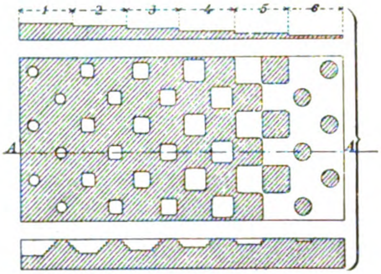
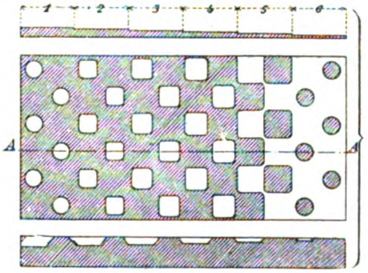


Fig. 14.



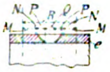


Fig. 10.

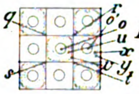


Fig. 11.

the intensities of the tones; that is to say, the portion 6 represents the transparent portions of the original (the lights), the portions 5, 4, 3, 2 the tones of increasing intensity up to the portion 1, which represents the opaque portions.

"The perchloride will pass first through the portions of the second layer which have been exposed the least, that is to say, the portions 1 corresponding to the deep shades, and will attack the metal everywhere where it is exposed, that is to say, in the centre *o* of the points *q*, *r*, *s*, *t* (fig. 11), which will be hollowed out and will spread as the etching is continued. The perchloride will then pass successively through the portions 2, 3, 4, 5 and 6, and will successively hollow out the centres of the points of bare metal, corresponding to the said tones.

"At the moment when the portions corresponding to the tone 6 will be only attacked at the centres of the points corresponding to the said tones, the hollows corresponding to the tone 5 will have spread to *u* (fig. 11), the hollows corresponding to the tone 4 will have spread to *v*. The action of etching will continue to spread towards the periphery and the hollow will assume the shape indicated by *v*. The etching continuing, the angles *q*, *r*, *s*, *t* of the resisting points of the layer will intersect each other, and the hollows corresponding to the tone 3 will spread to *y*. The hollows corresponding to the tone 2 will spread out to *x*, the hollows corresponding to the tone 1 will be very widely spread and will leave between them only a weak point. Moreover, the etching in these portions having been prolonged, the first layer will crack, and the perchloride, passing through the said layer, will granulate the surface of the points, and the finished plate will have the appearance shown in fig. 12.

"SPECIAL CONDITIONS DETERMINING THE USE OF THE DIFFERENT SHAPES OF SCREENS, THE NATURE OF THE FIRST LAYER, AND THE DENSITY OF THE MORDANT TO BE USED.

"Photographic prints have different characteristics as regards their photographic qualities, which will be defined with reference to three types in the following manner:—

"*First type.*—The difference of intensity between the lights and shades is normal: that is to say, the lights are transparent, and the shades strong without opacity. The details are well defined. The original or print is good.

"*Second type.*—The difference of intensity between the lights and shades is slight; that is to say, the lights are not absolutely transparent and the shades not very strong, the details being defined. The print is grey.

"*Third type.*—The difference of intensity between the lights and the shades is strong; that is to say, the pure lights are transparent, the shades are opaque, and the details are generally faintly drawn. The print is hard.

"In order to determine the variations to which the three elements which can be usefully modified (shape of the screen, kind of the first layer, density of the mordant) must be subjected in the different practical cases, let us examine first what will happen when the nature of the said three elements is normal, for obtaining a good result from a print of the first type.

"Experience has shown that the screen must be of the shape shown in fig. 4; the first layer is given by the following formula: Water 500 grains, bichromate of ammonia 12 grains, gum arabic 110 grains, sugar 8 grains, and ammonia 9·9 drops; the density of the perchloride of iron, 40° B.

"These elements having thus been experimentally determined, let the result of using them with the three types of print described be considered; assuming that for the purpose three copper plates are provided with a screen of the shape shown in fig. 4, with a first layer of the normal formula, and all three comprising a second sensitive layer of the same formula.

"Figs. 12–14 show the action of the etching on the three copper plates provided in the manner described with a screen of the form shown in fig. 4. These three plates comprise layers of the same kind, but they are exposed each under a different positive.

"Fig. 12 shows the action of etching on one of the said plates exposed under a positive which is good (first type).

"Fig. 14 shows the action of etching on one of the said plates exposed under a grey positive (second type).

"Fig. 13 shows the action of etching on one of the said plates exposed under a 'hard' positive (third type).

"Figs. 12–14 comprise each three views connected by a brace. The upper views represent the tones of the positive, the different intensities of which are represented by the different thicknesses. The portions 1 represent the shades, and the portions 6 the lights. The centre views are views in plan of the engraved plates, the surfaces of the hollows being shown by black portions.

"The bottom views are sections on the line A A of the engraved plates. They indicate the depth of the hollows corresponding to each of the tones and the gradation of the etching.

"Let the first of these plates (fig. 12) be exposed under a positive of the first type, that is to say, under a very good positive; the second under a positive of the second type (fig. 14); and the third under a positive of the third type (fig. 13).

"Let the etching be done then in a perchloride 40° B. By dividing up the action of the etching into three stages (first stage, etching the shades; second stage, etching half-tones; third stage, etching the lights), it will be seen that in the first stage the plate exposed under the hard positive will be first; that under the good original will be the second; and that under the grey original will be the third to be attacked in the shade portions.

"In the second stage the plate exposed under the grey original will be the first; that under the good original will be the second; and that under the hard original will be the third to be attacked in the half-tones.

"In the third stage the plate exposed under the grey original will be the first; that under the good original will be the second; and that under the hard original will be the third to be attacked in the light portions.

"In short, the plate exposed under the grey original print will be the last attacked and the first finished. The action of the mordant is, therefore, exercised for a very short time; the shades will not have had time to be sufficiently hollowed out, and the points will not be sufficiently reduced. On the other hand, the cracking of the first layer will not take place, so that, on being inked in, the plate will have a regular or uniform appearance. In order to increase the effect, it would have been necessary that at the shades the points should have been more 'reduced'; that is to say, that the said points should have been at the beginning of the etching smaller and less resisting. This would have been ensured by the use of a screen of the shape shown in fig. 7, and by the use for the first layer of a solution of smaller resistance.

"On the other hand, it is well known that, when the density of the perchloride is great, it passes with greater difficulty through the second layer, and passes through it only in the shade portions and up to a certain degree of exposure. It will, therefore, be possible to utilise this property, which, by the use of a perchloride of suitable density, will enable the shades to be hollowed out before attacking the half-tones and a sufficient hollow and reduction of the points to be obtained. When the said result is reached in the shade portion, the etching will be continued by substituting for the perchloride of high density a perchloride of smaller density which will pass through the half-tones and hollow out the metal, at the same time reducing the points. As regards the lights, the density of the perchloride will be still further decreased, and a plate engraved by gradation will be produced, which gradation will increase the effect by doing away with the uniformity of the etching. For facilitating the cracking of the first layer in the shade portion a solution of smaller resistance will be used for forming the said layer.

"Similar considerations deduced from the preceding observations would tend to show that when a hard print is used it is necessary to use for forming the first layer a screen of the form shown in fig. 6 and a solution of a greater resistance, and the different elements constituting the first layer and the densities of the mordants to be used for each of the three types of prints previously described could be defined as follows:—

"NORMAL ORIGINAL OR PRINT.

"First layer.—Screen of the shape shown in fig. 4 (transparent elements equal to opaque elements). Solution of the following formula: 500 grains of water, 12 grains of bichromate of ammonia, 100 grains of gum arabic, 6 grains of sugar, and 9·9 drops of ammonia.

"Etching.—First stage: Perchloride of 40° B. Second stage: Perchloride of 38° B. Third stage: Perchloride of 35° B.

"GREY ORIGINAL OR PRINT.

"First layer.—Screen of the shape shown in fig. 7 (transparent elements smaller than the opaque elements). Solution of the following formula: 500 grains of water, 12 grains of bichromate of ammonia, 110 grains of gum arabic, 8 grains of sugar, and 9·9 drops of ammonia.

"Etching.—First stage: Perchloride of 45° B. Second stage: Perchloride of 40° B. Third stage: Perchloride of 38° B.

"HARD ORIGINAL OR PRINT.

"First layer.—Screen of the form shown in fig. 6 (transparent elements larger than the opaque elements). Solution of the following formula: Water 500 grains, bichromate of ammonia 12 grains, gum arabic 135 grains, sugar 10 grains, and ammonia 9·9 drops.

"Etching.—First stage: Perchloride of 38° B. Second stage: Perchloride of 36° B. Third stage: Perchloride of 34° B.

"GENERAL APPLICATIONS OF THE PROCESS.

"It is possible by means of this process to produce engraving plates for printing in several colors, whether the original single color prints have been obtained by any of the reproduction processes at present used, or whether they have been obtained by the processes of photographic selection from nature or from originals in colors. It is, however, necessary to distinguish more particularly one of the most important applications which make it possible to produce from photographic color originals or prints obtained from nature by the Lumière processes (Autochrome plates), or by the processes of Ducos du Hauron, engraving plates by means of which it will be possible to print in three colors a polychromatic positive. In other words, it will be possible to obtain with a single polychromatic original or print three single-color printing plates (yellow, red, and blue) engraved direct in intaglio, which on being printed by the present process and registered on one and the same vehicle (paper, fabrics, etc.) will reproduce all the colors of the positive original or print used. For obtaining this result it will be necessary to prepare three copper plates which will be provided with an identical screen in the manner described, on a first layer of the same formula.

"The first of these plates will be covered with a second layer orthochromatised for the yellow; the second for the red; and the third for the blue.

"The first will be exposed under the original polychromatic print by arranging a violet screen on the glass of the printing frame; the second by a green screen; and the third by an orange screen.

"In that way, on the plates being exposed, the second layer on each of the said plates will be rendered insoluble, in proportion to the intensity of the yellow, red, and blue radiations, and on engraving there will be obtained on the first plate single-color reproduction in yellow, on the second ditto in red, and on the third plate ditto in blue.

"The superposed impressions of the said three engraved plates (yellow, red, and blue) will reproduce, without any touching up, the exact image of the color print or original used. In this kind of engraving and color printing the same perfection will be obtained as in engraving and printing in black.

"It will also be possible to obtain from single-color or polychromatic originals black or color printing plates of a subject in any size by applying the method of photographic projection to the present process."

An Address to the Process Man's Customers.

By Mr. H. Gatchel, of the Gatchel & Manning Co., Philadelphia.

"I WONDER whether the printer fully realises and appreciates how much credit is due to the photo-engraver for the vast strides and improvements that have been made in the printing industry the past twenty-five years.

"Following out the natural law of demand and supply, note the wonderful developments that have been made in printing presses, inks, rollers, papers, etc., to meet with the requirements of photo-engravings; note the vast increase in the quantity of printed matter, as well as the broadened variety of the product, among the more important of which may be mentioned calendars, post cards, blotters, magazines, newspapers, books, catalogues, etc., most of which are of value and exist chiefly because of the illustrations displayed therein—such illustrations having been made possible by the skill and the comparatively inexpensive product of the photo-engraver.

"Consider the vast influence that the product of the photo-engraver has had in widely disseminating knowledge throughout the world—by means of pictures—educating through the sight even the most illiterate. School-books of to-day are bright and attractive with illustrations, facsimiles of photograms; compare these with the dull books of the past, with absurd and grotesque woodcuts illustrating scenes that never existed.

"The photo-engraver faithfully reproduces landscapes, portraits, buildings, objects of merchandise, etc., making them either direct from the objects themselves or from photograms, and is often able to intensify and improve the details while faithfully reproducing a facsimile of the object itself. To meet the requirements of cost and the conditions under which the plates are to be printed, depending upon the copy and material furnished, he produces plates so that the desired illustrations may be either a line engraving or a half-tone.

"The interesting question surrounding photo-engraving was always that of price. Latterly this question had been greatly modified, most customers now, especially among the better class of buyers, making price secondary to quality. He urged the importance of quality in all half-tone work. If a half-tone is worth having at all, it is worth while to have a good one. The better the photo, the better the half-tone; and the better the half-tone the better the print from it will be.

"In considering the price, it was well for customers to realise that the final result depended much upon the preliminary work, and here it was possible for a careful engraver to use much skill, and thus produce a much more effective result. The etching and often the re-etching of plates invariably meant better half-tones; this added to the cost slightly while it improved the results immeasurably. It was not wise to compare the various prices of different engravers unless the same specifications—with a definite bunch of copy—were put up to each, and even then the prices should not always rule. Quality is of more growing importance than price.

"Mr. Gatchel referred to the oft-repeated proposition as to how much it was worth to sketch and etch a catalogue cover; he said it was a much better plan to say to an engraver: Get me up a sketch for a cover and keep the entire cost within a certain specified sum. In such cases the customer would invariably get the best results obtainable for the money expended. A customer would often get the cheapest photograms and expect good half-tones; this was false economy. Photo-engravings should not be rushed; the best results were obtainable when maximum care and attention were given to every detail. In conclusion, Mr. Gatchel paid tribute to the brainy pressman of modern times."—Condensed from *The American Stationer.*

A Point in Legal Procedure.

THE Levy-Hunter case will not only be a precedent in patent law, but also in the conduct of cases before the courts in which scientific experts are called. Mr. Justice Neville said, in opening his judgment:—"I wish in the first place to recur to a matter to which I referred at the trial. A practice has become prevalent of examining and cross-examining expert witnesses in patent actions which, in my opinion, is irregular and prejudicial to their proper trial. In an action for negligence arising from a street accident witnesses cannot be asked if in their opinion the defendant was guilty of negligence, nor, again, in a libel action where malice is material can witnesses be asked if in their opinion the defendant acted maliciously, because these are questions which are for the tribunal. In patent actions, however, witnesses are asked their opinion on every issue of law and fact which the Court has to decide—the construction of the specification, the existence of invention, anticipation, and so on. They are in fact treated as assessors rather than witnesses, and much time is occupied in combating their opinions in respect of matters upon which they are not entitled to express any opinion at all. Upon the matters really within their province—the explanation of terms of art, the nature and mode of operation of machinery, the mechanical or chemical laws availed of, the state of public knowledge, and so forth—there is usually little difference of opinion."

THE SQUARE-INCH PRICE FOR COPPER is giving some trouble in Chicago. 16-gauge was first charged at one cent (a halfpenny) per square inch, which was accepted as being the equivalent of the old weight-price. Then it dropped to one cent less 33⅓ per cent., and the joy was great. Very soon, however, the discount was decreased to 25 per cent., whereupon we are assured by *The Plate-Maker's Criterion* the square-inch price scheme was "decried as a delusion and a snare." Unfortunately, prices of material must go up and down, whether we buy by the pound or the inch. The trouble is that prices of blocks cannot fluctuate so easily. They can be lowered without any trouble, but to raise them is quite another thing.

A Quarter of a Century of Process Work.

By S. H. Horgan; in the Twenty-fifth Anniversary Issue of "The American Printer."

In order to realise the progress that has been made in preparing engravings for the printing press during the last twenty-five years, one must be reminded of the condition of engraving and process work at the beginning of that period.

Just think of it! The only illustrated daily newspaper in the world then was the New York *Daily Graphic*, and its illustrations were printed on lithographic presses. It was crowded out later by the other papers, led by the New York *World*, which began on March 12th, 1884, to use cuts. Such are the revenges of time that at the close of the quarter century under consideration it looks as though the offset press might be printing daily papers and the methods of the *Daily Graphic* would return to favor.

Wood Engraving and other Processes.

Wood engraving can be said to have reached its zenith twenty-five years ago, to fall soon from its proud position partly through the egotism of those who practised it, but chiefly from photo-engraving, which was being encouraged by publishers on account of the increased speed and lower cost which it promised.

Steel engraving was, in 1885, still considered the only way to embellish biographies with frontispiece portraits; the heliotype and artotype processes were used in the illustration of high-priced editions; the cerographic process had firmly established itself for map engraving, a position which it continues to hold to this day; chalk-plate engraving was considered "high art" on newspapers west of Philadelphia, and the paper with the chalk-plate outfit had been beaten by its rival, not so elaborately prepared for cut making, by running a cut of Lydia Pinkham as "The Late Queen of Greece."

Pen-and-Ink Drawing.

The few magazines of that day still clung to wood engraving, though the weekly papers were beginning to use photo-engraving in a timid and experimental way. Through the galaxy of artists schooled on the *Daily Graphic*, pen-and-ink drawing had become the finest method of art expression in illustration, though the processes for reproducing "line" drawings into perfectly printable plates had not quite arrived.

The Moss Process.

There were two methods of photo-engraving in the lead then; Moss, through his "swelled gelatine" method, had been the pioneer. His plates were stereotypes from plaster of Paris moulds, with the surface of the lines slightly convex. This rounded surface of the lines made it possible for the overlay cutter to get all kinds of effects from these cuts. The proof supplied by Moss with the cut was seldom duplicated by the pressman on the edition, and the fact that the metal of which the cuts were made would not stand the wear of a long edition furnished the reason for seeking other methods to supersede his.

The photo-electrotype or "wash-out" process was the one that promised most. The cut resulting from it was an electrotype made from a sheet of hardened gelatin in which the sunken portions between the lines had been "washed out" while these portions of the gelatin were soft. The surface of the lines in a photo-electrotype had a concave tendency which gave the pressman some trouble until the pounding of the press brought the edges of the lines level with the surface.

ZINC ETCHING DEVELOPED.

Strange to say that just then William Kurtz, famous as a photographer, was experimenting with the discarded zinc etching in relief which was destined to supersede the other photo-engraving processes. He began in a cellar opposite the New York Post-office, and with the assistance of F. A. Ringler founded the Electro-Light Engraving Company, which company put zinc etching in the position that it holds to-day.

The year 1885 will always be an historical one in photo-engraving, for it was in that year, at Crosscup & West's engraving shop in Philadelphia, that a man named Purton put into use "enamel." This is the gelatin or glue coating on the metal which resists the action of the acid mordant during etching and gives us the copper half-tone which leads all other engraved blocks in use.

IVES INVENTS HIS METHOD.

The present writer had invented a method of making half-tones used on the *Daily Graphic* during the late seventies. These attracted the attention of a student at Cornell, who, after leaving college, experimented with half-tone until he invented the method of half-tone which is in use all over the world. This is Frederick E. Ives, who should also be credited with making, in 1887, the first three-color relief blocks. This also occurred in Philadelphia, as did the making of the best half-tone screens, so necessary in process work.

In March 1884 the American Press Association began to send out cuts in their stereotype plates to the smaller papers throughout the whole United States. By 1885 the effect of this began to show itself upon the papers in the large cities. It took many years for them to recognise fully that illustrations, no matter what the cost, paid for themselves as circulation winners. Pictures in the daily press stimulated a demand for better illustrations, until to-day no publication could acquire a large circulation without process work of some nature.

POPULARISING PHOTO-ENGRAVING.

The coming of the ten-cent magazine was another factor in popularising photo-engraving. Wood engravers could no longer compete with the methods backed by the camera. Half-tones at from thirty to fifty cents a square inch were preferred by some publishers on account of the speed with which they could be had, and by the public and artists because of the faithfulness of reproduction.

COLOR PRINTS FROM THREE BLOCKS.

In 1892 W. H. Bartholomew began to attract attention in New York by the marvellous half-tones he was making. Though only one hundred and thirty-three lines to the inch, they possessed a crispness and printing quality that made them sought after by all the magazines.

Just at this time William Kurtz began to show some remarkable color prints made from three blocks. A group of fruit which he exhibited was so faithful in color reproduction as to cause a sensation in the printing world. The inks and presses were not ready for three-color printing, so Kurtz sank his fortune, but he must always be remembered as the pioneer of practical three-color engraving and printing in this country, if not in the world.

The World's Fair at Chicago in 1893 was the next great stimulus to process work. It brought to that city the most skilled workmen, and both Philadelphia and New York had to yield the palm to the "Windy City" for the superiority of its photo-engraving in particular. It was here also that three-color process work was first made commercially profitable. Then it was, too, that the Chicago *Inter-Ocean* issued color supplements that have not been improved upon since, though from their initiative came some of the dauby colored horrors issued as supplements by Sunday papers.

HALF-TONES IN NEWSPAPERS.

In 1897 the writer invented and patented a method of inserting original half-tone plates in the stereotype plates used on the daily newspapers. The New York *Tribune* was the first to use the invention, and from there half-tone spread to other papers until now it has gone around the world. In 1898 he had the first heavy press built to pull proofs from half-tones, which called press builders' attention to the fact that all presses needed strengthening on account of the extra pressure required to get a satisfactory impression from half-tones.

To show how quickly the use of half-tones spread, in 1899 the *Illustrated London News*, that formerly required sixty wood engravers to illustrate twenty-four pages, had enlarged to forty pages without having a single wood engraver employed. Our own *Collier's*, *Harper's Weekly*, and the rest of the publications before this time, began to adopt photo-engraving for all their illustrations, so process workers thought they were at last to be rewarded for all their previous years of experimentation and financial losses.

UNBUSINESS-LIKE COMPETITION.

The spirit of jealousy, which seems to hover around all artistic pursuits, and which had haunted process engraving from the beginning, soon showed itself in unbusiness-like competition and price-cutting until the charges for photo-engraving were frequently lower than the actual cost of production. Publishers were not slow to take advantage of this by encouraging small concerns to supply still cheaper products, the result being that the publishers, by playing one photo-engraver against another, have prevented any of them from making money, while they, the publishers, have piled up fortunes from the product of process work.

THE WORKMEN.

While the suicidal competition among engravers was going on the workman was the principal sufferer. Here also the policy of playing one workman against another was used, until his wage was brought down to the level of the unskilled class. His position was only secure until another workman came along and offered to work for less money. These conditions drove him into organising for his own protection, with the result that the photo-engravers' union is one of the strongest labor organisations in the country. Its members are being paid living wages, their positions are secure, they are perfecting themselves in their work and preventing process work from becoming so unremunerative as to drive the intelligent labor required to seek other occupations.

IMPROVEMENTS IN THE WORK.

Better paid labor brought about a general improvement in the work. The screens used in half-tone making became finer until one hundred and fifty lines to the inch was most common and engraving with one hundred and seventy-five and even two hundred lines to the inch came into use on the magazines. It was in color-plate making that this improvement was most noticeable. Striking covers were found to attract buyers to magazines, and only by the use of colors could they be made saleable, so that the display of publications on a news stand to-day looks, from a distance, like a floral display. This demand for color plates compelled engravers to specialise in that work, so that now the successful makers of color plates are those who confine themselves to that work exclusively.

LITHOGRAPHIC PROCESSES.

During these twenty-five years numerous engraving processes have been put forward promising revolutionary changes. Some of them made a sensation for a time, but are now forgotten. Printing from aluminium as a substitute for lithographic stone was one of these that failed. Out of it, however, has sprung the idea of printing from metal on to a rubber sheet and offsetting the impression on paper or other surface. This is the principle of the offset press which at the present time is causing so much concern in the printing world and promises to be one of the methods that will survive.

INTAGLIO ENGRAVING.

Intaglio engraving, which gives superior results to that printed from relief plates, has had photography applied to it. Thirty years ago the writer engraved plates in that manner that were highly praised by publishers, but they had to be printed slowly by hand, which made the expense so great as to be prohibitive. Fifteen years later an English firm found that by photo-engraving intaglio on a copper roll and utilising the presses in use for printing on fabrics and wall-paper, they could print these intaglio engraved rolls profitably. To-day, both in Germany and our own country, there are several concerns printing photogravures from rotary presses at high speed, and one of them in New York making marvellous color prints. This method of engraving and rapid printing promises to furnish the highest art results possible from the printing press.

EXTENT OF ENGRAVING INDUSTRY.

To-day the various lines of process work in New York alone employ about fifteen hundred workmen, and the number of salesmen, clerks, and others depending on it for a living is about one thousand more. Should all process work be stopped for one month in this country, the number of failures among magazine and other publishers would show how dependent millions of dollars of capital are upon this industry. Notwithstanding this, few photo-engraving firms are making money, for the reason that theirs is not a manufacturing business that can make up its product in large quantities for future sale. It is dependent on orders, like the legal, medical, or other professions, with the further disadvantage that it has permitted the publishers to pit one engraver against another in such terrific business competition that there is little chance for either money to be made or improvement to come in the quality of the work.

It is to be hoped that in the next quarter century process work of all kinds will become a more staple business, attracting to it men of higher art perception, the results of whose talent will bring our work, next to that of the brush, pencil, and pen of the artist, to the place it should occupy among the graphic arts.

"Good Engravings and Better Ones."

MR. H. A. Gatchel advises *The American Printer* and its readers on further improvements in catalogue illustration:—

"We can all prate glibly about the successive steps of 'attraction,' 'arousing curiosity,' 'exciting interest,' and 'convincing,' the progressive course of a selling argument, but how few put this knowledge into practice!

"And yet a little common sense will remove many of the seeming obstacles. As has been said often before: A manager will be scrupulous to a degree concerning the salesmen he sends abroad to represent his house. In addition to their appearance and manner, he insists on a sufficient knowledge of the selling points of his product to permit the salesman to point out to the prospect the reasons why his proposition is better than his competitor's.

"In buying engravings of subjects along mechanical lines, it is apparent to the critical observer of advertising literature that equally thorough preparation is not given the illustrations (the silent salesmen).

"The buyer insists that the engravings shall have a good appearance, but he does not insist that they shall emphasise the selling points as he does with his salesman. When a salesman, however neat and correct in appearance, calls on a prospect, is his work done? Is his 'front' supposed to be sufficiently convincing to render argument unnecessary? Or is he supposed to convince the prospect after his appearance has got him a hearing?

"Suppose we are selling a lathe with special adjustments for economically turning difficult work. It is too often the practice to make a cut of the entire lathe, with the inevitable result that the particular feature is reduced to microscopic proportions and there is no emphasis on the feature that differentiates this lathe from others.

"The next higher class of illustration of such a subject would be where only sufficient of the machine is shown to indicate its character, permitting the details of special interest to be large enough to be intelligible.

"The best method is where the cutting tools and the special object being turned are re-etched and engraved to stand out prominently against the other parts which are kept dark and subdued.

"These tools and their relations to each other are the 'selling points' of the machine. In the full view of the lathe they would be indistinguishable. In the detail cut they are shown plainly, but in the best engraving they thrust themselves on the attention.

"This is but one instance of many that could be cited, but it illustrates the point that there is a vast difference between several engravings of one subject, all of which look good.

"A buyer of machinery is familiar with the various types of machines needed in his plant, therefore a picture along familiar lines is not likely to make him pause when glancing over the pages of a trade journal or catalogue. One turns over the pages in much the same way as he looks at his watch, and, on being questioned, is unable to tell the time.

"The more strongly the meritorious points of a machine are emphasised in a cut the more readily will they be recalled when needed, though they should pass apparently unheeded when first seen."

Blocks to Standard.

ELSEWHERE in this issue the decision of the Swiss engravers to standardise the thickness of their engraved metal is mentioned. Total thickness of the block has long been accepted as standard type-high, but this leaves the other two dimensions uncertain. *The Practical Printer* takes up this subject and urges that all blocks should be trimmed to pica, instead of to inches and fractions of an inch. It does not mention that some of the American block-makers have already adopted the rule of trimming everything to "point" dimensions, and that machines graduated for this (instead of for inches and eighths) are on the market. *The P.P.* says:—

"It has been the custom of engravers and electrotypers to trim cuts to the inch scale. This is no doubt due to the fact that all trimming machines have been constructed on that basis, and the gauges for adjustment have shown the ordinary inch rule. This condition is not to be wondered at, for it is only in recent years that any concerted, intelligent effort has been made to reduce the standard of measurement in the allied printing arts to a uniform basis. Considering the fact that immediately the cuts are received in the composing-room they henceforth associate with materials and methods based on the pica unit of measurement, it is manifestly improper that no regard to their ultimate use and association be considered in their making.

"It is only necessary to call the attention of practical printers to the matter to enlist their endorsement to the suggestion that engravers and electrotypers should be prevailed upon to trim all cuts to pica measure. The advantages of this reform are numerous and obvious. An accurate estimate of time wasted in justifying odd-size cuts in a 100-page catalogue would convince the most theoretical employer that it would be to his interest to buy cuts of an engraver who uses pica graduation.

"The matter is of vital importance to all printers, and should be made the subject of agitation until it becomes one of the established reforms in the business. Typefounders have agreed upon a uniform standard of measurement because it was demanded; and persistent demand for pica graduated cuts will add another time-saving reform to swell the profits of printers.

"I have talked to engravers of this matter, and find that they entertain the idea that the adoption of this method must of necessity revolutionise their system of charges and cause confusion in their workrooms. Just why this impression should exist to the extent it does is not apparent, and is undoubtedly due to a lack of investigation on the part of the engravers. A small expenditure would change the graduation marks on the adjusting rules of their machines, and to the workman there is no difference between setting his gauge to a pica mark or to a fraction of an inch. The matter is worthy of careful consideration."

AN ADVERTISING HOLIDAY is one of the recent experiments of Chicago, which sent a party of fifty "boosters" of the city (otherwise progressive and aggressive business men) on a fortnight's cruise to twenty-six cities and towns on the shores of Lakes Michigan and Superior. "Process" was represented by Mr. E. W. Houser, President of the Barnes-Crosby Company, who did not, however, make half-tones on board the vessel, though a newspaper, *The Daily Log*, was published as a part of the enterprise.

Publications.

"COLLODION EMULSION," the book by Henry O. Klein, F.R.P.S., is so generally recognised as a standard on its subject that we need only briefly refer to the issue of the second edition, revised and enlarged. In the new edition some thirty pages of supplementary matter and an extra plate are included—divided, like the body of the book, into theoretical and practical. The book is well produced, with illustrations and ten plates, and is substantially bound. Its price is 5s. net, post free 5s. 5d., from Penrose & Co., Ltd., Farringdon Road, London, E.C.

AN EXCELLENT BOOK that has established itself as a standard, and reached a fifth edition, is *Chemistry for Photographers*, by Charles F. Townsend, F.C.S. It gives the principal formulæ used in photographic operations, with lucid explanation of the reasons why certain things are done and certain chemicals used. While its greatest value is to those who will read it through, making notes of all points bearing on their own work, it is also useful as a reference-book, to be consulted when a hitch or difficulty occurs, and its arrangement in fifteen chapters with cyclopædic index makes reference easy. From "Chemistry generally" to "Resins, Varnishes, etc.," the whole field is surveyed. Price 1s. net, postage extra. London: Dawbarn & Ward, Ltd., 68-74 Carter Lane, E.C.

Specimens and so forth.

CANADIAN ENTERPRISE is well illustrated in a booklet and set of specimens entitled *Real Results from Ransom*, the work of the Ransom Engraving Company, 14-16 Princes Street, Winnipeg. The inscription is by Edgar J. Ransom—"To the Patrons who are my Friends, and the Friends who may become my Patrons," and the specimens include half-tone in one, two, and three colors — all of very high quality. Especially effective are a poster design for the Winnipeg Exhibition and a full-page picture advertisement for Ogilvie's flour.

PROOFS ARE SENT OUT in many different styles. A very attractive enclosure is used by the Ransom Engraving Company, of Winnipeg, in which the brown paper of the large envelope is worked effectively into a design printed in black and white. The left-hand side is occupied by a seated figure of a lady examining a print which she takes from a portfolio, and across the top of the envelope is the name of the firm in an antique script.

A HOLIDAY NOTICE issued by the Barnes Crosby Co. is rightly praised by *The American Printer*, which says:—"Here was a chance to show recipients of the card that this house did the most casual things in a thorough way appropriate to the occasion; and just this mental impression went along with the printorial one. Reputation is but the aggregate of many such small impressions deposited as it were one after another on the minds of the public. In view of their relation to success none *are* small."

PHILIPSON, SON & SKILLETER, whose commencement of a series of sample reproductions of the same subject by various processes was mentioned last month, have issued their second example. The first was printed from a line block; the second is by photo-litho; and with commendable consideration for those who may have disregarded the request to keep the first for comparison, they now send the two together. The softness and delicacy of the photo-litho treatment is well contrasted with the strength and relative hardness of the letterpress print.

SPECIMENS FROM THE LEEDS CENTRAL TECHNICAL SCHOOL include half a dozen examples of half-tone in monochrome and three-color by the students under Mr. S. E. Bottomley, F.R.P.S., and Mr. Guy Symmons. Credit is given to the individual students for their very good work, the names being S. Scholes, G. Preston, and E. Field for negatives and blocks in half-tone; D. Sellman for line negatives and blocks; T. Gutteridge for a half-tone negative from which the block was made by J. Burton; and T. Smith, N. Lee, E. Field, A. Whitham, J. Burton, and J. Tasker as co-operators on the three-color negatives and blocks. The tail-piece blocks are by N. Lee and D. Sellman.

FOR INFORMATION OF CUSTOMERS it is perhaps well to publish a list of the different classes of work undertaken. This, at least, is the idea of the Eclipse Engraving Co., Cleveland, Ohio. They say: "We are often asked, even by good customers, 'Do you make electrotypes?' or 'Do you do photographing?'" In answer to these, they publish, from time to time, attractive booklets dealing with one or more sections of their business, in which they include lists of all their principal lines, divided under Commercial Photography, Art, Photo Engraving and Wood Engraving, Color Department, Electrotyping, Die Sinking and Catalogues.

We wonder how many of our readers could say off-hand which of the most widely-advertising firms do or do not undertake wood engraving. Or if they were presented with a list of the thirty best-known concerns in the world, of how many could they say whether they make litho-transfers, or poster half-tones, or three-color work, or whether they have any section for stock-design electros? How many could name half a dozen firms in England, on the Continent, or in America, from which they could be sure of getting good sets of blocks for three-color picture post cards, made at the best reduce-and-print-together-from-uniform-water-color-originals rate? And if they named them, could they say whether these firms undertook the printing as well as the block-making?

If most of these questions could not be answered by men in the trade, is it not likely that good would be done by spreading this class of information amongst the general public and possible customers?

Business.

THE SPECIALIST IN LITHO-PLATES is a natural result of the perfecting and popularising of offset-litho methods, and the new firm of R. E. Wilkinson & Sons, 18 Bethel Street, Norwich, is quite abreast of the times in announcing itself as photo-lithographers, offset plate makers, and photo-engravers. Photo-litho transfers in line, grain, and stipple; half-tone (high-light) photo-litho; zinc and aluminium plates; tri-color photo-litho transfers; half-tone blocks; original trade photography; and enlargements up to 60 x 40 inches, are amongst the lines offered. Mr. Wilkinson, who is "late of the Meisenbach Company, and of Jarrold & Sons, Ltd.," combines energy and enterprise with wide experience, that should be very useful to many lithographers.

Brevities.

FRANKLINPRINT is the name given by the Franklin Printing Company, of Philadephia, to its offset lithography.

THE STAR ENGRAVING COMPANY, of Des Moines, Ia., has added the words "and printing" to its title, has installed a printing plant, and has increased its capital to $75,000 (£15,000).

EIGHT ETCHING-MACHINES are said (by *The Inland Printer*) to be on the American market. We think that most of them are still in the patent-specification-and-experiment stage.

THE SWISS PROCESS MEN have decided on one uniform thickness for the metal of their process blocks, whether zinc, copper, or brass. This will be two millimetres, and will go into force on 1st January 1911.

SOME OPINIONS ON THE VALUE OF ILLUSTRATION is a booklet issued by Carl Hentschel, Ltd., for the Business Exhibition, and quoting the opinions of thirty great advertisers in favor of the superiority of illustrated, as compared with plain type, advertising.

THE BUSINESS EXHIBITION at Olympia had good displays of photo-mechanical work by Carl Hentschel, Ltd., the Anglo-Engraving Co., Ltd., and the Photochrom Co., Ltd., while, of course, a large proportion of the exhibitors showed the effective use of various "process" methods.

AS THE SCENE OF A NOVEL we should hardly expect to find the office of a photo-engraving firm, but in *Nine to Six-thirty*, by W. Pett Ridge (London: Methuen & Co.), we find the heroine employed by a process house—and teaching them something, in addition to doing well for herself.

THE ADVERTISING OF A COUNTRY or a colony is becoming a highly specialised business. One of the latest organisations for this purpose is concerned with pushing the claims and advantages of the State of Wisconsin. It is estimated that from £10,000 to £20,000 annually will be spent for advertising the State.

ETCHING-MACHINES IN A BEDROOM.—The enterprising demonstrator of the Holmström etching-machines showed two of them (one biting zinc and the other copper) in his bedroom at a hotel in Buffalo during the Convention of the International Association of Process Engravers. The machines were run from the electric-light plug.

A Retirement.—Mr. Best, for some years general manager of Messrs. Gilchrist Bros., Leeds, has resigned his position owing to ill health. His departure will be very greatly regretted by all. Commencing with the firm when it was only a small works, he has been instrumental, by his great energy and ability, in raising it to its present position, which is that of being one of the largest engraving houses outside of London. Every member of the firm will greatly miss his kindly advice and sound judgment.

He intends spending most of his time in travelling on the Continent, and it is the hope of all who know him that he will soon be restored to health, and thus be in a position to enjoy his retirement and well-earned rest.

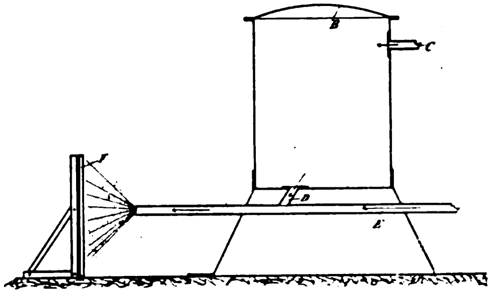
A trumpet call to lithographers is addressed to its readers by *The National Lithographer*. It urges them to make the most of the possibilities of photography, using them, with the recent improvements in printing methods, to recover the ground which lithography has lost to the letterpress printer. Our own trumpet-call should be to process men to undertake the photographic side of litho-work just as they have done of letterpress.

John Haddon & Co. have gone seriously into the business of supplying the wants of photo-engravers since they were joined by Mr. W. C. Kimber. This month they announce that they have become sole selling agents for the excellent Johnson screens; that they are constructing a new half-tone proof press; and that they will shortly issue a new catalogue of process engravers' machinery and materials. They are also pushing the Norwich film, to which we referred recently.

Formic acid is being used by photo-engravers instead of acetic acid. One part of formic acid to ten parts of water is said to be far more efficient than even pure acetic acid in stripping negatives. For developing, Boston photographers are now using one part of formic acid to twenty-five parts of sulphate of iron solution, the latter being made up to the strength of 10° to 12° by the hydrometer. It is claimed that the developer can be weaker in iron when formic instead of acetic acid is used. For cleaning glass plates, instead of nitric acid or lye, formic acid can be used in the proportion of one part of formic acid to ten parts of water. So also in brightening up copper plates before or after etching or before re-etching, one part of formic acid can be used to twelve parts of salt and water.—*The Inland Printer.*

The Beck Engraving Company, Philadelphia, has opened, in the three topmost floors of the great new building of the Curtis Publishing Company, the finest building in America specially made for a publishing concern. The Beck Company has hitherto handled about 60 per cent of the process work for the Curtis Company, and in the new premises expects to do the whole of their business, in addition to much other work. The floors for the engraving house have been specially built, just as have the engine-rooms, press-rooms, etc., which are occupied by the owners of the building, and an almost entirely new equipment has been installed. The Becks, father and son, aim at the best possible, and are glad to show their place to any visiting photo-engraver.

Leigh's Truchelut Patent.—There has been some discussion as to the supposed difference between Truchelut's British patent (communicated by H. H. Leigh, No. 991 of 1896) and his original French patent. The question is as to supposed differences in the design of the blast-etching or abrading machine. The accompanying cut, reduced from Leigh, may be compared with the one from Truchelut (p. 198 of our September issue), when it will be seen that there is no difference in construction, though the drawing is different.



Sketches on spec often cause trouble, and the Lammers-Shilling Engraving Company is having a fight with an agricultural implement concern to which it submitted a special design for a letter-head. The recipient preferred the design of some other firm, and when asked to return the sketch, wrote:—"We were not aware that your sketch was of any value unless we wanted to order some letter-heads, so we may not have kept it." The engravers replied that they had to invest real money in the sketch, and that, as they had to pay the artist, they will expect the customer to pay them, unless the sketch is returned.

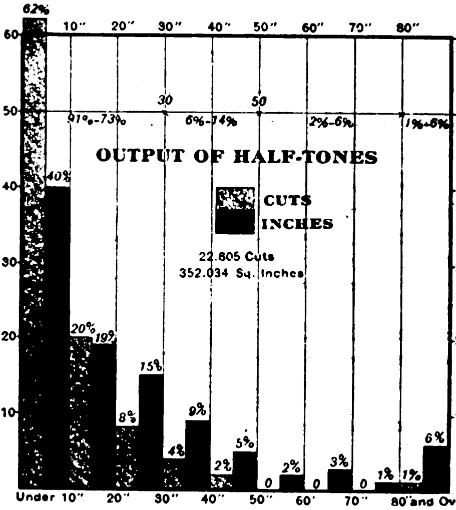
There is far too much submitting of designs "on spec," as if the time of an artist was not worth money; and it is scarcely surprising that a customer has a low idea of the value of what is produced so rashly by some houses.

THE BRUSSELS EXHIBITION RESULTS include many awards of interest to our readers. Many firms interested in photographic and photo-mechanical matters have scored in many classes; as, for instance, Burroughs, Wellcome & Company, who receive the Grand Prix twice in Class 3, Higher education, Scientific institutions; once in Class 13, Photography; Class 16, Medicine, etc. (two G.P.); Class 31, Automobiles and cycles; Class 41, Non-edible agricultural products; Class 87, Applied chemistry and pharmacy (three G.P.); Class 99, Travelling equipment, etc.; Class 111, Hygiene; Class 119, Special products for export to the Colonies; and Class 125, Hygienic and sanitary appliances. The same firm received gold medals in Class 54, Products of wild crops, and Class 109, Institutions for the intellectual and moral improvement of working men; a silver medal in Class 91, Tobacco, and Class 98, Brushes, fancy articles, etc.; diploma of honour in Class 38, Theory of agriculture; Class 51, Hunting and sporting equipment; Class 56, Farinaceous products; Class 111, Hygiene. This grand total of thirteen Grand Prix, two gold and two silver medals, and four diplomas of honor must be almost a record.

Other results include:—*Typography*, etc., G.P., Waterlow & Sons, Ltd. Dip. Hon., Valentine & Sons, Ltd. G.M., the Aerograph Company, Ltd. *Photography*, G.P., the Aerograph Company; Ilford, Ltd.; Johnson & Sons, Ltd.; Oxford University Press; the Platinotype Company; Valentine & Sons, Ltd.; and Wellington & Ward. *Mathematical Instruments*, G.P., John J. Griffin & Sons, Ltd. *Medicine and Surgery*, G.P., John J. Griffin & Sons, Ltd.; G.M., The Tintometer, Ltd. *Electro-Chemistry*, G.M., John J. Griffin & Sons, Ltd. *Plant used in preparation of Food Products*, S.M., Tintometer, Ltd. *Wall-papers and Paper-hangings*, Dip. Hon., Aerograph Company, Ltd. *Pottery and Porcelain*, G.M., Aerograph Company, Ltd. *Heating and Ventilation*, John J. Griffin & Sons, Ltd. *Dyeing and Finishing Textiles*, S.M., Aerograph Company, Ltd. *Applied Chemistry*, G.P., Johnson, Matthew & Co., Ltd.; Dip. Hon., Baird & Tatlock; John J. Griffin & Sons, Ltd. *Leather and Hides*, S.M., Tintometer, Ltd.

MORE FIGURES AS TO SIZES OF CUTS were given at the recent Convention of the I.A.P.E. by George H. Benedict, who has stuck to this part of process investigation with a most praiseworthy persistence. He says:—

"As an evidence of the comparatively small number of large cuts made, here are some figures taken from the reports of another concern that has an accurate record of every cut made. These figures cover a total of 22,805 half-tones, aggregating 352,034 sq. in., of which 14,332 cuts, or 62 per cent., were minimums; 4663 cuts, or 20 per cent., 10 to 20 sq. in.; 1845 cuts, or 8 per cent., 20 to 30 sq. in.; 956 cuts, or 4 per cent., 30 to 40 sq. in.; 401 cuts, or 2 per cent., 40 to 50 sq. in.; 149 cuts, or 0 per cent., 50 to 60 sq. in.; 166 cuts, or 0 per cent., 60 to 70 sq. in.; 54 cuts, or 0 per cent., 70 to 80 sq. in.; 239 cuts, or 1 per cent., over 80 sq. in.; 20,840 cuts, or 91 per cent., were under 30 sq. in.; 1357 cuts, or 6 per cent., 30 to 50 sq. in.; 369 cuts, or 2 per cent., 50 to 80 sq. in.; 239 cuts, or 1 per cent., over 80 sq. in.



"A comparison of the percentage of cuts and inches of output is shown in the diagram above.

"If a photo-engraver has no records of his own output to compare with these figures, what better evidence can he ask than this diagram to be shown that the *large cut is only a phantom* and should not be considered as a factor in deciding on any plan to reform the method of charging for photo-engravings?"

Estab. Jan. 1894.
"The Process
Photogram."

THE PROCESS
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MONTHLY

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Machine Etching.

NO. XX. THE HOLT MACHINE.

By Frank Colebrook.

Previous Articles and Notes.—1906: I. Jan., Dr. Albert's Method; *II. Feb., Concewitz's Method; *III. March, Levy's Method, and notes; IV. May, the Holmström Method; *V. June, Swain's Views on the Levy Method; VI. Sept., W. G. Thorpe's Method; *VII. Oct., The Mark Smith Method; *VIII. Nov., More about the Mark Smith Method; *IX. Dec., More about the Dr. Albert Method, and notes. 1908: X. Feb., More about the Mark Smith and the Dr. Albert Method; *XI. June, The Method of Giulio Danesi; *XII. July, The Boyce Machine; *XIII. Dec., Dr. Albert's Patent; 1909: *XIV. May, Piolunkowski's Patent; *XV. June, The Holt Etching Machine; *XVI. July, The Mark Smith Rotary Spray Etching Machine; *XVII. August, The Levy Process. 1910: *XVIII. July, A. M. Truchelut's Patent. See also May 1910, The Theory of Hand and Machine Etching; July 1910, Dangers of Machine Etching. * XIX. Oct. 1910, The Smith-Ahle Machine.

*** Indicates illustrations.**

THE Holt etching machine is in one respect a type of advanced machinery in general. That is to say, its inventor has proceeded upon past experience and has improved upon what he has observed, mainly in the direction of simplification. The result is that the etcher is compact, simple, rigid, comparatively inexpensive, and very efficient.

The writer had the opportunity of examining the machines at the city and the country works of John Swain & Son, Ltd. He had previously made a minute study of the working of all the etching machines so far introduced into Great Britain. The first thing noted in the examination was the simplicity of the machine structure. There is nothing to get out of gear, and everything is instantly at the operator's control. The Holt etcher consists essentially of a square tank suspended at a distance from the ground convenient for the worker's reach, the tank being underborne and overarched by a strong iron frame. From the top of this frame depends a rotating shaft which gives motion to a horizontal disc. That disc, or projections upon it, causes the desired agitation of the liquid contents of the tank. The tank is made of porcelain, and it is a unique feature of this etcher that a large number of plates can be placed in the tank and etched simultaneously. This is a point to be emphasised.

A Holt etcher containing perchloride of iron was working on copper plates at the visit. The plates were first dipped into a solution of iron and afterwards rinsed off, or alternatively into a solution of salt and acetic acid, the purpose being to get rid of any trace of grease. Then they were laid upon a floating wooden platform within the tank. The plates were not shifted by force of the agitation from the position in which they were placed upon the floating platform, although there are no upstanding rods nor obstacles of any kind to keep them *in situ*. It appears that the force of the acid is essentially a downward, not a lateral force, and hence the absence of shifting. The height of the floating platform is controlled instantly by movements of a small lever in the tank.

Alongside this first machine was another filled with nitric acid, for zinc etching. The plates to be etched were placed upon a large sheet of glass. The reason a glass slab is employed, and not one of wood, is that the latter could not be got scientifically level, as the necessities of the operation require shall be the case. The nitric acid solution need not be maintained at such a strength as is needful in other etching machines, in which the action is more violent at the outset. There is nothing gained by producing an instantaneous and high intensity of acid, rapidly reaching culmination and rapidly losing life and force, as in the familiar example of the effervescing Seidlitz powder. The acid is not drained right away at stated periods. The plates are washed, and if it then appears that a little fresh acid is needed, an addition is easily made.

The renewal of the perchloride is somewhat different. The custom in the works visited, where something like 20,000 inches of half-tone plates are etched week by week by one machine, is to draw off a fair-sized jugful of the perchloride at the end of the second day's work and add a jugful of fresh liquid, and once a week to renew the whole bath. A hydrometer is used to test the strength of the solution.

Plates being placed on the wooden float of the perchloride bath, or upon the glass slab of the nitric bath, each bath is closed by shutting down the flap at either end. The closing in is not absolute. A large circular space is left uncovered by the flaps, but nothing of the acid can be seen; for looking down through the circular aperture in the centre of the top of the tank we see the large horizontal disc. Its circumference is much greater than that of the aperture, so that none of the acid is splashed upwards and outwards when the rotating is in progress.

The agitation is effected by a number of plates depending from the underside of the disc. These have a plough or scoop-like form, and therefore give a lift to the acid liquid which they encounter. That alone would ensure two movements—a continual rotary or whirlpool motion of liquid, diversified by the upward scooping, which might be called by comparison with the other trend an almost vertical force. But even this does not exhaust the intricacy of the play. What of complexity there is anywhere in the Holt etcher seems to be represented in the arrangement of these plates, or vanes. There are four large plates, broader at one end, and near to the broad end of each is a smaller plate, extremely narrow and even in its narrowness.

Each of the large plates forces the etching liquid towards the centre of its own concave outline, where a passage way is cut, and through that passage way the etch is expelled in streams which cross each other.

We had provided a plate thought suitable for testing. It was dipped in a weak solution of nitric acid and salt to clear it from grease, and was at once placed in the perchloride bath. A minute and three-quarters elapsed before the rotary movement was stopped and the plate was taken out. It was at once placed in the tank of water that any remaining perchloride might be removed without any injury of the surface. There is a danger of some streakiness arising from the very quick-ness with which the perchloride leaves the surface of the plate, in some machines, particularly where the plate to be etched is placed face downwards. In pulling it up, and so to say pulling it back, it is unavoidable that there shall be an unequal trailing off of acid from the face, and this is apt to leave a disagreeable record. It is difficult to convey in print how this trouble is avoided. Broadly the plates upon the wooden support are, by lever action, gradually floated up to the top. There is greater slowness in the operation of plate removal. The plate when removed is instantly immersed in water or some other cleanser.

We put our hands upon the machine at various points, and certainly there is no vibration. There is no noise either, and no smell. To add another useful negative, we could see nothing seriously likely to get out of order, and no reason why a machine so strong and simple should not be doing its work for many years. One machine we saw had cost not a penny for repairs in its two years of constant and heavy work.

One-eighth of a horse-power suffices to drive this etcher, or say about the same energy as a 16-candle-power lamp.

The Holt plan is in general to use a slightly weaker acid than other machine etchers employ, but rather more of it; on the principle that it is better to take a very little longer to etch if you are thereby etching more reliably.

The plate which was etched for the writer's satisfaction was placed in what is considered by some machine etchers to be the very worst part of the machine, *i.e.* right in the centre. A prevalent idea is that the action is essentially centrifugal, so the full force is to be experienced at the outskirts of the field of operation.

Casting about for any fault to be found, reasonable or unreasonable, with the application of mechanical and chemical principles here made, we are still baffled; for what little metal there is in any direct or indirect contact with the acid or its fumes passes through an arm or sleeve which is full of grease, and every time that metal is lowered or raised a fresh application of grease is received.

Another detail is the use of ball bearings throughout. In a word, it is precisian's carefulness in composition and in maintenance which has resulted in the important fact that one machine is capable of effectually etching from 3000 to 4000 inches of copper in the day. In the works of Messrs. John Swain & Son, Ltd., the perchloride bath was being regularly worked right up to its full efficiency. It is going all day, and sometimes it is etching sixteen plates at one time.

What the Process Salesman Said.

By James F. Tobin, in "The American Printer."

[This is probably a rather fancy sketch of what a salesman could do in settling complaints; but it illustrates a way in which a man who is equipped to do it may help his employers mightily.—ED.]

THE engraving salesman toiled up the three flights of stairs leading to the office of the Pica Printing Company. He paused in the outer gloom of the landing, wiped the perspiration off his manly brow, replaced the tired, disgusted look on his face with one of genial cordiality, then swung blithely through the door with a pleasant "Good morning."

The blonde at the typewriter glanced languidly at his card. When she saw the name of the Zingbat Engraving Company she smiled derisively and said:—

"I guess you don't want to see the boss to-day."

"No? Well, you have another guess, my dear," modestly replied the salesman. "I'm simply filled with an insatiable yearning! Why shouldn't I want to see him?"

"You know that lot of half-tones you people made for us last week? Well, the boss says they won't print, and he's just waiting to throw you out when you come."

"Thanks awfully," said the salesman. "Do you know I felt this morning that there was a hiatus, a sort of an aching void, a longing for an intangible something in my bright young life, and I guess a four-round go with the boss will just about fill the bill and——"

Just then the door of the press-room opened and the boss came in.

An entire change took place in the salesman's demeanour. The good-natured grin gave way to an expression of alert earnestness, and when he spoke, his voice, though pleasant and cordial, was pregnant with force and decision.

"Good morning, Mr Pica. What can I say about engravings that will interest you this morning?"

The boss ignored the extended hand and said:

"That concern of yours makes me sick. You come around here blowing about the quality of your half-tones, and when we give you an order, why, the plates are no good."

"Didn't we submit proofs? You O.K.'d them."

"Yes, the proofs were all right; I guess you people know how to doctor proofs."

"See here," interrupted the salesman, "you may or may not have a legitimate kick coming. Sometimes we turn out an order that's not up to our usual standard—perhaps this is one—but you must cut out any insinuations of crookedness. If the proofs were all right, the plates were all right, and if they don't print in your shop it is because your men don't know how to print them."

"Is that so?" sneered the boss. "Maybe you'd like to come out in the press-room and show us how."

"I'm not a printer," answered the salesman, "but perhaps it would be worth while to take a look around at that."

They passed through the composing-room into the press-room. The salesman was introduced to the foreman and listened attentively to his account of slurred and spongy-looking impressions, etc. The salesman said little, but nothing escaped his attention. He went from press to press, scrutinised the sheets as they were delivered, examined the presses, and watched a forme just being made ready. As he turned from the window where he had been examining a sheet with a magnifying glass he took from his pocket, the noon whistle blew.

The hum of the flying belts and the clanging of the machinery was replaced by the sound of scurrying feet and the ding ding of the time clock.

"Well," said the boss impatiently, "what have you got to say for yourself? Ain't the plant all right? Ain't we running them right? You've seen all you wanted to see. Are those half-tones no good or not?"

"I want to talk for about ten minutes," said the salesman, "and I would like all your pressmen to hear what I have to say. Can you fix it with them to sacrifice that much of their lunch hour?"

After a few moments' consultation with the men who had been seated by the windows eating their lunch, the foreman returned, accompanied by several others.

The boss introduced the salesman, saying he had something to tell them about printing half-tones.

The salesman, with a few words of apology for intruding on their lunch hour, said:—

"See this magnifying glass I have in my hand? It's what the weavers call a thread counter. Every pressman should have one and at intervals examine with it one of the sheets to see that the half-tone stipples are printing up sharp and clean. To do this will take much less time than you think, and you have the advantage of *knowing* how the plates are printing. Now, as to the printing of this particular order you have in hand. I have noticed several things that are probably causing trouble. I watched our friend here making ready. Those plates he was working on are going to print poorly; he had too much overlay on them, and where the color should print solid and clean, it is going to look spongy. Next, I noticed that on one of the presses there was oil on the roller ways; that means uneven friction, with the result that the roller, instead of rolling over the forme with a uniform movement, is apt to 'skid'; you know the smeary results of that.

"On that second press from the end the grippers and gripper fingers are not set right. Instead of keeping the sheet flat for the moment of impression, they are set so as to cause the sheet to buckle up in the centre. This may seem trifling, but it's trifles that make the difference between bad and good work.

"There are some other things that effect results in printing, which you printers know better than I do, but which perhaps you overlook or neglect — cheap ink, for instance. If the ink has not the proper 'body,' the stipples of the half-tone will not print solid. The result is washy and slurred-looking work.

"Do you always wash up your formes thoroughly when taken off press? I noticed with my glass some of the half-tones on the table over there look very much clogged up.

"Poor furniture used in locking up a forme will prevent the forme from lying flat on the bed of the press; you practical men know what follows.

"Now, boys, I'm not trying to teach you your business; but the boss here has claimed that our half-tones were not running well. I didn't believe—and I believe still less now—that it was the fault of the plates. I think the unsatisfactory results are due to the little things I have mentioned, and I have no doubt that you all are proud enough of your reputation as first-class pressmen to be glad to have these things pointed out to you.

"I'm not going to detain you any longer, boys, and I just want to thank you and ask you to have one of my boss's cigars. These are the kind he keeps in the second drawer on the right-hand side for the big fellows that come in, so they're all right. So long, boys. Thank you."

The boss looked thoughtful as he led the way back to the office.

"There may be something in what you said out there," he said reflectively. "Anyhow, I'm going to see that the evils you spoke of are remedied. I'll send you a copy of it for criticism; and say, old man, I want to apologise for the way I greeted you."

"No apologies," interrupted the salesman; "none are needed. I wouldn't give a tinker's objurgation for a man who wouldn't put up a good stiff kick when he thought somebody was doing him. Come up to the hotel and have lunch with me."

And they went out into the sunshine together.

The Block-maker and his Specimens.

SOME price-lists from John Royle & Sons are good reminders of the adage that the shoemaker's wife ought to be well shod, for the illustrations are of the very high quality that we might expect in the work of a firm interested in supplying machines of refinement to block-makers. The lists have nothing to do with our own trade, but belong to another branch of Royle activity, the manufacture and supply of machines for making tubings and for insulating wires and cables. The three blocks we have borrowed illustrate little groups of small fittings, fixtures and incidental operating tools that may need replacement in connection with the machines, and many such groups are used—one for each pattern of machine. It seems an ideal way of dealing with this part of a catalogue. The grouping enables a large number of small items to be dealt with in a little space. The arrangement, and particularly the way in which the black and the bright parts are assorted, shows each piece clearly and distinctly in a minimum amount of room, and the photographing, shadow-working, and final finishing touches give such a suggestion of real texture, surface, and perspective, that the mere novice amongst machine-minders can find a given part at once, and see its name in the list below the illustration. Such carefully finished work gives distinction and "tone" to a catalogue. It suggests to the buyer of machines that the manufacturer is exact in detail and finish; careful in the little things as well as in the great.

Block-makers who specialise in illustrating machine-catalogues will of course take interest in these little pictures, and may criticise them adversely in some respects—as, for instance, suggesting that some of the pattern-numbers are too small to be read easily; but we want to use them as a suggestion for the general block-maker. We wish we could show him the exceedingly dainty, well-printed lists, on carefully chosen paper, with beautiful, simple, dignified covers, "finished" in every respect. We would do this if we could, because in spite of the very fine example set by many firms, in spite of the practice and precept of the best printing journals, and of the annuals—*Penrose's Annual*, *Klimsch's Jahrbuch*, and *The Graphic Arts Year Book*—there is still much bad specimening amongst the block-makers. Their samples should be good throughout, from the conception of the designs to the handwriting on the envelope in which the sample-book is delivered to the customer. In too many cases "any sort of subject" seems good enough for a block-maker's specimen. For instance, in the Levy-Hunter law case more than one witness admitted that his original was a bad subject, or, at least, was much worse than it might have been. An expert may be able to judge of the technical quality of the work when shown a proof after a bad original, but the good effect upon the ordinary man depends upon the general appeal of the finished result, and especially upon its appeal at first sight, Even the counsel and judge in the Levy-Hunter case found it difficult to separate the bad quality of the originals (which were not before them) from the technical details that the proofs were meant to illustrate, and much more must this be the case with a man receiving a collection of specimens in which he has no preconceived interest, if the total first-sight effect is not good.

The paper on which many block-makers' specimens are printed is not good enough. Often the ink is too cheap or unsuitable in color. Very often the size of the paper is unsuitable to display the block at its best, and the titling is displayed,—usually in type too large for either picture or margin, and sometimes in type of several incongruous founts. Many people send out their specimens loose and unattached, which is all right when there are several of them, on good, stiff paper, all trimmed to exactly the same size, and exactly fitting their portfolio or stiffened envelope. But when a dozen miscellaneous things on paper of varying weights and sizes, some printed singly, as plates, and others folded in four-page and eight-page circulars, are thrust haphazard into a flimsy envelope, they are apt to make a poor impression on arrival.

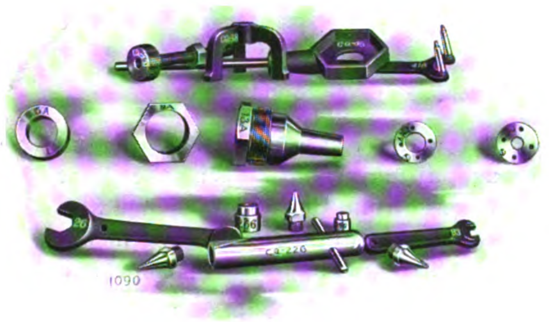


FIG. 1.

The trimming and enveloping are very important, for the first impression is made upon the customer by the envelope, and the second by the condition in which the prints come therefrom. A thin envelope, with no protecting stiffener, from which the proofs come in a jumbled heap, with creases and dogs-earing of the larger ones, gives an impression of slovenliness and want of ambition; or, at the very least, of want of supervision over the subordinates who may have done the actual specimening.

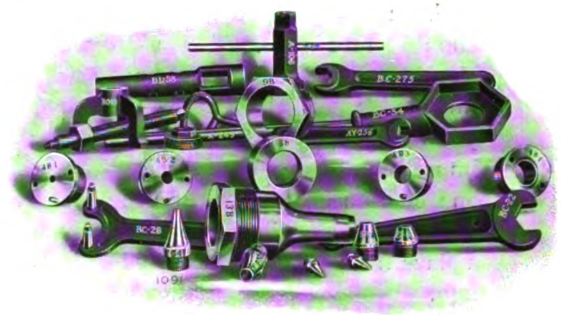


FIG. 2.

Specimens should not mainly—they should not at all— be employed to induce customers to transfer work from some other block-maker to the one sending the specimens. They should rather be used (*a*) for securing new customers by suggesting the uses of illustration to those who have not yet employed it as they ought to do; (*b*) for increasing the demands of present clients by suggesting new applications, new styles of work, etc.; (*c*) for increasing the confidence of present clients by showing that you are alert and up-to-date, sufficiently proud of your work to be anxious to show it, and sufficiently appreciative of their custom to be anxious to show your best to them.

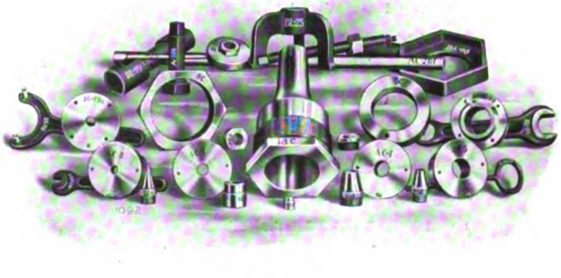


FIG. 3.

From start to finish the specimening should have care. The addressing list should be revised by someone with a knowledge of the trade—not by the youngest typist or the office-boy; for an impression of carelessness is given when one customer receives three or four sets of specimens or finds them addressed to a place from which he removed some years ago.

The addressing is as important as the list. The amount saved by using an odd-time office-boy instead of a person of business knowledge is a false economy. The few shillings of difference may mean that hundreds of people on whom you want to make a good impression receive communications addressed in a feeble, unformed hand, badly spaced, carelessly spelled, with incomplete addresses, or with such solecisms as Mr. Cassell & Co. Ltd.; Dr. Theodore Lynch Esq., and so forth. This sort of thing does harm, wasting good postage stamps and making undesirable impressions.

There can be no doubt that good, liberal, frequent, and striking appeals by specimen pay very well indeed, but to avoid waste of effort the work must be fine in every detail.

The "Thames" Plate: Direct Application to Trichrome Half-tone.

O. S. Dawson and C. L. Finlay claim patent for the use of the "Thames" plate as the basis of a three-color process. They say:—"In producing photographic impressions, usually negative, for color-printing work, three-color work for instance, a usual method has been to expose separate plates each through a monochromatic filter of the necessary color located in the vicinity of the lens, and, for breaking up the image, to place in front of and near to the sensitive plate a Levy or equivalent cross-line screen the position of which in the camera is varied between each exposure, as well understood, by the aid of accurate adjusting means provided for the purpose.

"In the exercise of the present invention the cross-line screen and means for varying screen position between each exposure as above referred to are dispensed with. For each required impression a sensitive plate or equivalent is placed in contact with or near to and exposed through a multicolor screen, the light proceeding from the object being first caused to pass through a single monochrome filter of appropriate color and preferably located in the vicinity of the lens.

"Such use of monochromatic light filters according to this invention is distinguishable from the employment in the vicinity of the lens of the well-known yellow compensating filter.

"For producing printing surfaces such photographic impressions can be caused to form corresponding impressions on the said printing surfaces.

"Advantageously the color screen employed can be such as forms the subject matter of Letters Patent No. 19,652 of 1906 granted to one of us.

"It will of course be obvious that instead of employing a monochromatic light filter as described, the use of monochromatic light obtained in other ways might be resorted to, but the former is the preferred method.

"It has been proposed to obtain a single polychromatic negative by placing a polychromatic screen in front of and close to a light sensitive surface and exposing the plate in the camera to ordinary light through such screen, the colored negative obtained being afterwards utilised for obtaining impressions suitable for color printing by exposing separate plates behind and in contact therewith in conjunction, at each exposure, with a monochromatic screen of the necessary color located in the vicinity of the lens. Such process obviously involves the production and use of an impression that in the exercise of this invention is entirely dispensed with."

Arthur Cox's Patent Mount.

The Cox Engraving Company has long been interested in the search for a perfect system of mounting process engravings and has given great attention to the selecting and treatment of woods, as well as to experiments with substitutes for the wood mount. Now Mr. Arthur Cox claims patent for a system described and illustrated as follows:—

"The invention has for its object to provide mounts of improved construction and comprises the formation and union of the wood and metal portions as hereinafter described. The figures are perspective views illustrating the method of producing my improved mounts. The same reference letters in the different views indicate the same parts.

"An oak or other wood block *a* has formed across it in both directions a number of saw cuts, slots, or grooves *b* as shown in fig. 1. The block is then placed in a suitable mould and has cast upon it the metal portion *c* which covers one surface and fills the grooves in the part *a* as shown in fig. 2. Preferably the metal consists of a readily fusible alloy of lead, tin and antimony, or bismuth. Subsequently the wood portion at the underside of the block which is not grooved is removed, leaving a number of separate small wood blocks embedded in the metal as shown in fig. 3. The complete block is then cut to the required size along the continuous metal portions so that the sides of the finished block present metal faces. A finished block with the wood portions uppermost is shown in fig. 4, the sides and under-surface being all metal.

Fig.1

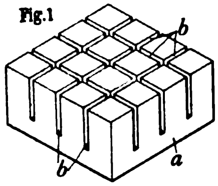


Fig.2

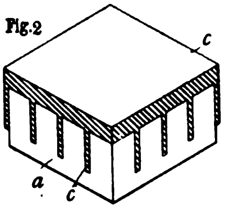


Fig.3

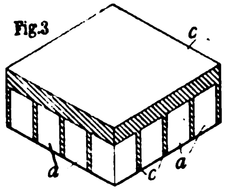
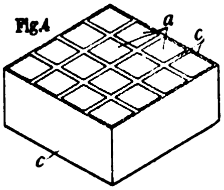


Fig.4



"The printing plate is placed on the side of the mount in which the wood blocks are exposed, and is attached to such blocks by screws or nails as with the wood mounts at present extensively used. In service, however, the printing pressure is taken entirely by the metal, the thickness of metal at the underside of the mount and between the blocks being made sufficient to resist such pressure. Instead of wood any other suitable soft material such as a compressed pulp may be used. Mounts constructed as above described can be readily produced at small cost. The wood cannot warp and thereby distort the mounts as in some constructions, neither is difficulty experienced through swelling of the wood by absorption of moisture."

Machine-Printed Photogravure: Another Roller Engraving Patent.

Edward Hudson, of London, and Arthur Benson Sleigh, of Cranford, Purley, Surrey, claim patent for an invention relating to printing cylinders bearing combined letterpress matter and illustrations, or letterpress matter or illustrations separately, in "intaglio."

They say that "it has already been proposed to work, by coating the cylinder with a sensitised emulsion, photographically printing the desired illustration through a positive film, and then etching. It has also been proposed to produce letterpress 'intaglio' by printing on a transparent sheet and photo-printing on to the cylinder, which is then etched in the usual manner.

"The invention aims to avoid the necessity for thick films with their incidental disadvantages as regards trimming at the edges, and to facilitate their application to the cylinder. It consists in applying films bearing letterpress matter, illustrations, or both, to a base or cover sheet, and then wrapping the sheet around the sensitised cylinder.

"Another important feature of the invention comprises a permanent transparent cover sheet or stretcher upon which the films—either unmounted or mounted on a thin film—may be simply laid and temporarily secured and can then be wrapped around and tensioned on the cylinder to ensure complete contact without the use of adhesive, the cover sheet being available for repeated use, and permitting of rapid and accurate operation.

"The accompanying drawings illustrate several modes of carrying out the invention.

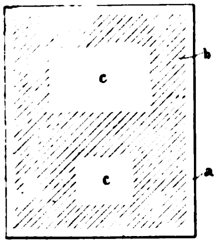


Fig. 1.

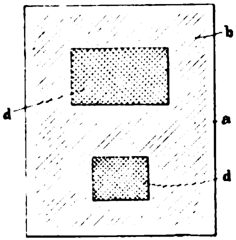


Fig. 2

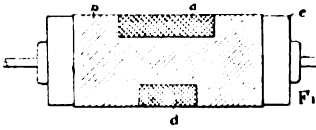


Fig. 3

"Figs. 1, 2, and 3 diagrammatically illustrate several steps according to one mode. Fig. 4 diagrammatically illustrates a step in an alternative mode. Figs. 5–8 illustrate certain mechanical devices which may be employed to secure the cover sheet to the printing cylinder.

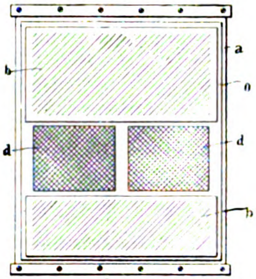


Fig. 4.

"In carrying out the invention (for example, in the preparing a cylinder to print a sheet containing illustrations surrounded by letterpress) the letterpress is first set up in a forme in the usual manner. It is then printed with non-actinic ink on to a sheet of transparent material, or it may be photographed, blank spaces being left where the illlustrations are to occur.

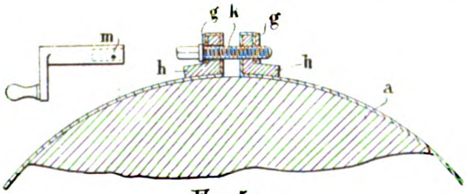


Fig. 5

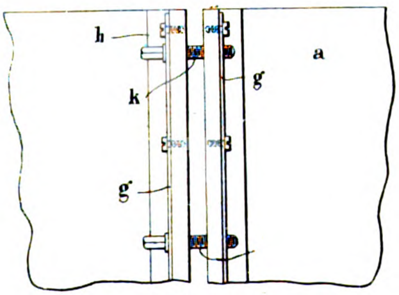


Fig. 6

"In figs. 1 to 3, *a* is the cover sheet on which the letterpress matter *b* has been printed or photographed. The letterpress is illustrated by single hatch lines. The spaces for illustrations are indicated at *c*. Transparencies of the illustrations (preferably of less thickness than usual) are cut to their exact size and mounted on the transparent sheet in their allotted spaces. These films are indicated by the cross-hatched portions *d* in fig. 2. As they are mounted they need not be so thick as usual, and being thin are capable of accurate trimming without the liability to lift up or cockle at the edges. The compound transparency so formed is then wrapped around the sensitised printing cylinder *e*. The transparency may be secured by a suitable adhesive, but it is preferred to simply secure it by a mechanical device adapted to draw the edges together to tension it adequately. The photographic print is then made, the transparency removed, and the cylinder etched in the usual manner.

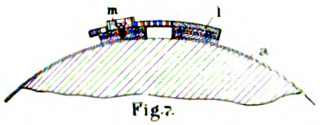


Fig. 7.

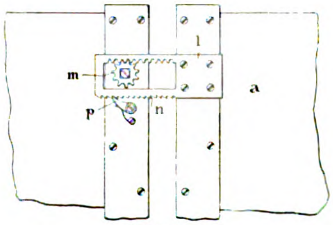


Fig. 8.

"In another mode of carrying out the invention the letterpress and illustrations may be on separate films *b* and *d* (fig. 4). These may be mounted on a thin transparent sheet or film *o*, and the composite film is then laid upon a cover sheet or stretcher *a*, or the mounting sheet *o* may in certain cases be dispensed with, the films *b d* being simply laid directly on the cover sheet. In either case temporary fastenings not likely to injure the cover sheet may be used to prevent shifting of the films or mounting sheet. When the photographic print has been made the cover sheet is removed. It is capable of repeated use, may be of comparatively thick material, and accurate rapid operation is possible.

"In certain cases the letterpress matter may be produced upon its film photographically, although it is preferred to print it thereon from a forme or in some other similar manner. The illustrations are preferably obtained photographically, but even these may be printed upon their films. In some cases a forme may be set up with both letterpress matter and illustrations, and printed upon a single film which can be applied to the cylinder by means of a cover sheet, as above described.

"The edges of the cover sheet may be reinforced in any suitable manner, and it may be tensioned upon the cylinder by any convenient mechanism. For example, the edges of the sheet may be passed under and over angle bars *h* (figs. 5 and 6), to which they may be clamped by plates *g* screwed thereto. The surfaces of the bars *h* adjacent to the cylinder are preferably made to conform to the latter, to ensure correct and complete contact between the sheet or the films thereon and the cylinder. The bars *h* may be drawn together by screws *k*, which may have square ends conveniently operable by a key *m* or other tool. Levers, cams, or other devices may be substituted for the screws if desired.

"In another form, as indicated in figs. 7 and 8, one bar may be fitted with rack plates *l*, and the other with pinions *m* engaging therewith, the rack plates also having ratchet teeth *n* engaged by detents *p*. Any other suitable mechanism may be used for tensioning the cover sheet, and the latter may be used for films bearing illustrations only, letterpress matter only, or both together."

Internal Craft Absurdities versus *External Trade Abuses.*

By George H. Benedict.

An entire lack of knowledge of the article produced — is awfully absurd.

A lack of uniformity in charges for regular lines of work of equal quality—is really ridiculous.

An entire lack of system in charges for unusual and special lines of work—is discrediting to the craft.

Doing rush-work at regular rates without consideration of the increased cost of production—is a monstrous stupidity.

Deliberately reducing prices when business is dull and the cost of production is highest—is pernicious and degrading competition.

Giving *trade* prices to transient customers—is the height of business folly.

Giving *special* prices to brokers and hypercritical customers — is a glaring inconsistency,

Hiring Help: Getting employés away from competitors raises wages, creates discord and a malignant desire to retaliate in like manner. Insist on references from would-be employés and you will save both money and friendship.

Salesmen: The traveller whose only argument is—"can save you money"—who divulges trade secrets to show how it can be done—who indicates by his methods that he thinks it is his duty to get the best price for the customer instead of a fair price for the firm that pays his salary—is the worst competitor the employer can have, and a worse foe to the craft than the customer who deliberately lies about the prices he has been offered.

Advertising: It is better to be left out of a good advertising medium than to be buncoed into a contract with a bad one. When in doubt, don't. Stay out and you have the money—go in and you have not even a gold brick.

Credits: Insist on references from would-be debtors and you will save money. An unwise credit and a ten-pound loss means all the profit on the next hundred-pound contract.

Machine-Etching.

No. XXI. Matteson and Gould's Machine.

WILLIAM MATTESON and Tom Birch Gould, of the Northern Art Reproduction Co. Ltd., of 47 Thomas Street, Liverpool, claim patent for a machine described and illustrated in the following:—

"A swinging tray supports the plate and causes it to move backwards and forwards in front of an acid-impelling device to equalise the action of the etch all over the surface of the plate. The movement of the tray is necessary because the strength of the current of liquid varies in the different regions of action of the impelling device. As impelling members screw propellers are employed. The propellers and tray are simultaneously removable from the liquid for the removal and insertion of plates. The bath is preferably enclosed by a lid so connected with the parts in which the propellers and tray are carried that, when the lid is opened, the latter rise out of the bath. The lid is preferably interlocked with the mechanism which moves the propellers and tray so that it cannot come into operation while the lid is open.

"In the drawings, fig. 1 is a side elevation partly in section showing the lid closed, and the propellers and tray in position for etching; fig. 2 shows the lid open and the propellers and tray raised out of the bath; fig. 3 is a plan view, part of the lid being removed; and fig. 4 is an end elevation partly in section.

"The plate is carried by the tray 2 in bath 1 beneath the propellers 5. The lid consists of two parts 6 and 7. The main part 6 is attached to a frame-work 10, which serves as a support for the bearings in which the shafts 11 of the propellers are mounted. This frame-work is hinged at one end on the main driving shaft 12, so that with the main part of the lid and the propellers it can be turned up clear of the bath. The parts which are lifted are counter-balanced by weights 14^a, 14^b attached to chain 13 over pulleys mounted at the upper ends of uprights near the main shaft. To prevent the etch from being splashed out, the bath is preferably provided with an upstanding flange around the seating for the lid, and the holes through which the propeller shafts pass have collars above and below.

"The tray 2 is carried by arms 3 and 4 mounted to permit a swinging motion in a plane approximately parallel with the plane of the propellers. For this purpose the arms are pivotally connected at their upper ends with shorter arms 45 and 44 mounted on brackets 9 and 8. The bracket 8 is attached to the framework 10 so that the upward movement of this latter when the lid is opened causes a corresponding movement of the arms 4, thus lifting one end of the tray. The brackets 9 are mounted on the smaller part of the lid 7. This part carries at its inner end a roller 35 which, when the lid is closed, lies within a recess 36 in the end of the main part of the lid. When part 6 is raised, the lower face of the recess presses against the roller 35 and lifts the inner end of the part 7, throwing it into the position shown in fig. 2, the movement being preferably assisted by a counter-weight on the part 7. By this means the arms 3 are raised, thus lifting the other end of the tray 2.

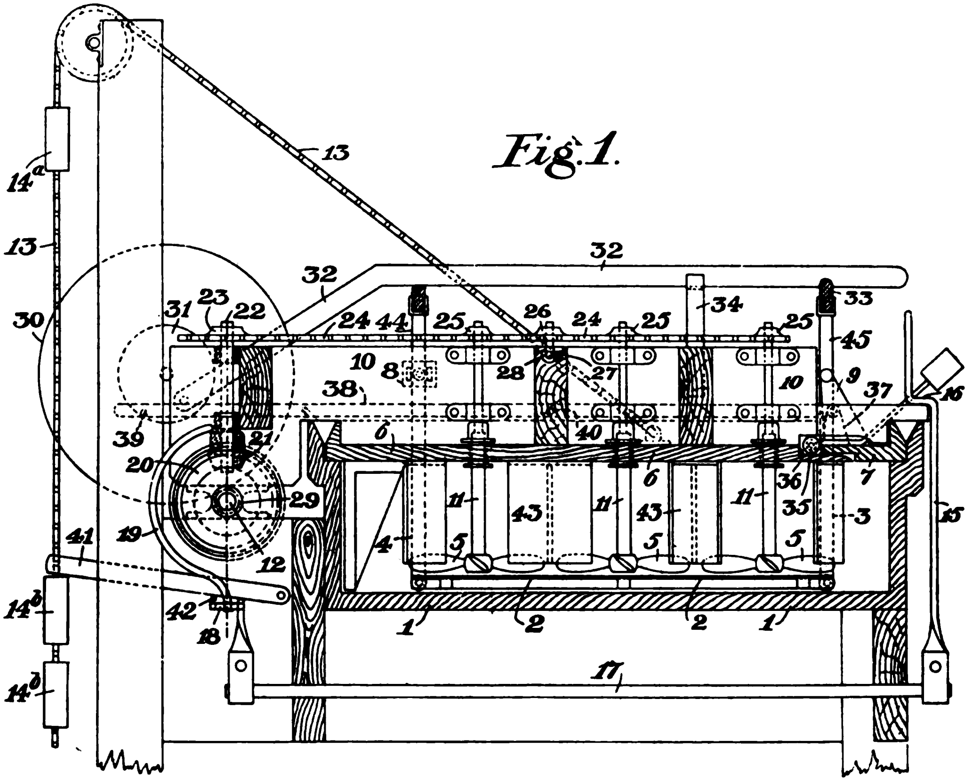


Fig. 1.

"To retain the parts of the lid in the open positions, a rod 38 is provided, mounted at one end on a bracket 37 on the part of the lid 7. This rod, when the lid is closed, lies along one side of the bath as shown in fig. 3. When the lid is opened this rod slides over a pin 40 projecting from the side of the part 6 until, when the fully opened positions have been reached, this pin enters a notch 39 adjacent to the free end of the rod 38 (see fig. 2). When the lid is closed it is secured by a pivoted arm 15, an off-set portion 16 on which engages over the projecting end of the lid 6. The arm 15 is mounted on a rocking shaft 17, which is connected at its other end with a sliding member 18 which carries the belt fork 19. The movement of the arms 15 which is necessary to free the lid to permit it to be opened causes a movement of the slide member 18 and fork 19 so that the belt is thrown on to the loose pulley, and, since the arm 15 cannot return into its original position until the lid has been fully closed, it is impossible to start the propellers and the tray until the lid has been closed. As a further safeguard, the locking lever 41 is provided. This is actuated by the weights 14^{a} and 14^{b}, and carries a pin 42 to engage in a notch in the sliding member 18. For this engagement it is necessary, first, that the member 18 should be moved by the arm 15 to throw the belt on to the loose pulley; and second, that the weight 14^{b}, which in the closed position of the lid retains the lever 41 in the raised position (see fig. 1), should be lowered to permit the lever to fall. When the lid has been fully opened the weight 14^{a} comes upon the end of the lever 41 and ensures that the pin 42 shall enter the notch in the sliding member 18. Where a direct electrical drive is used the shaft 17 may be arranged to move the starting lever or to close the switch of an automatic starter.

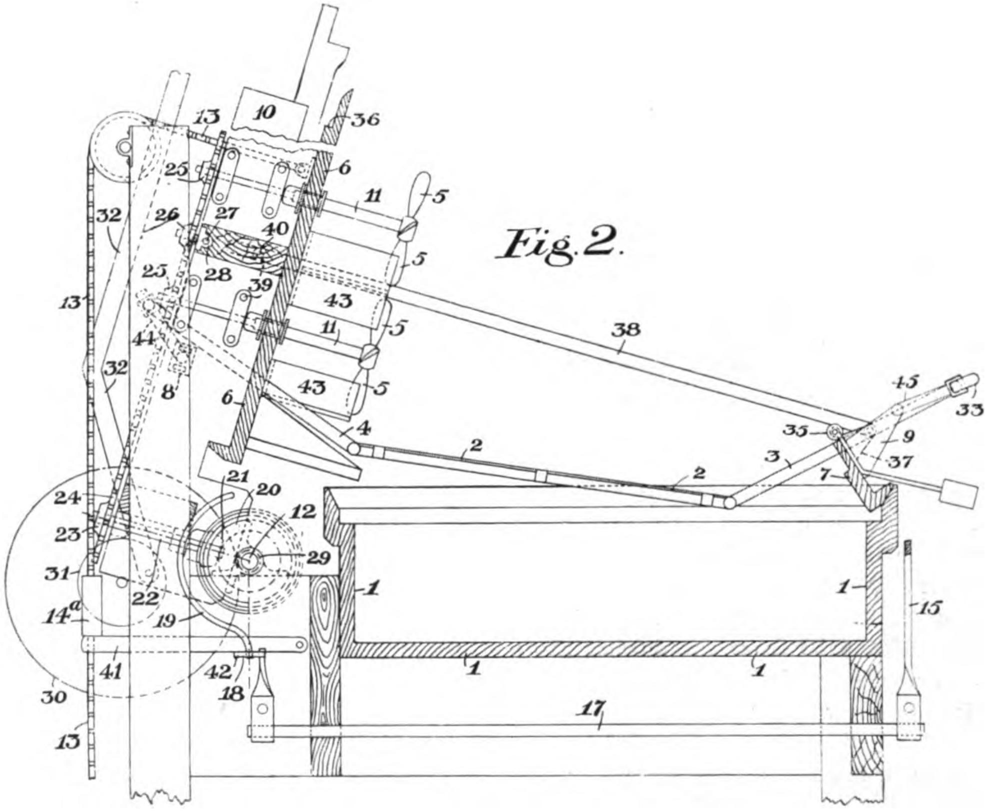
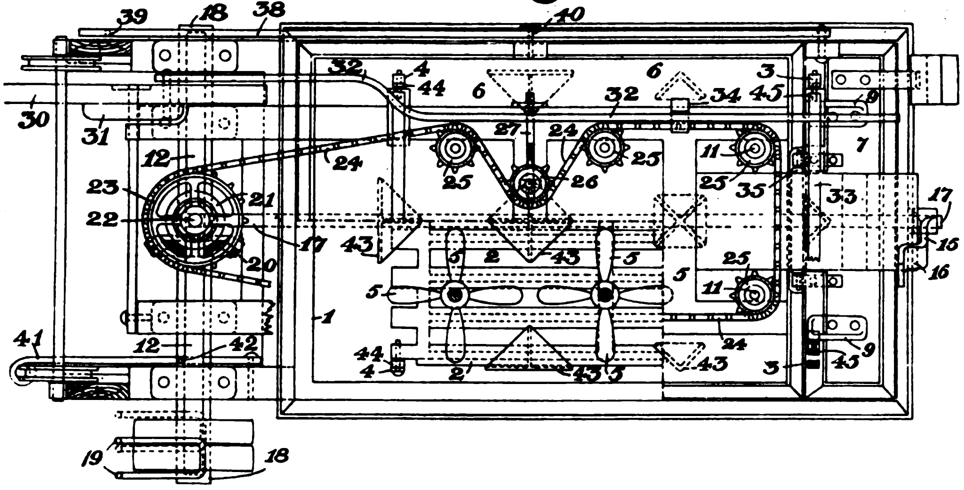


Fig. 2.

"Motion is transmitted to the propellers 5 from the driving shaft 12 by bevel wheels 20, 21 (fig. 4) which drive the shaft 22 on which is mounted the sprocket wheel 23 around which passes the chain

Fig. 3.

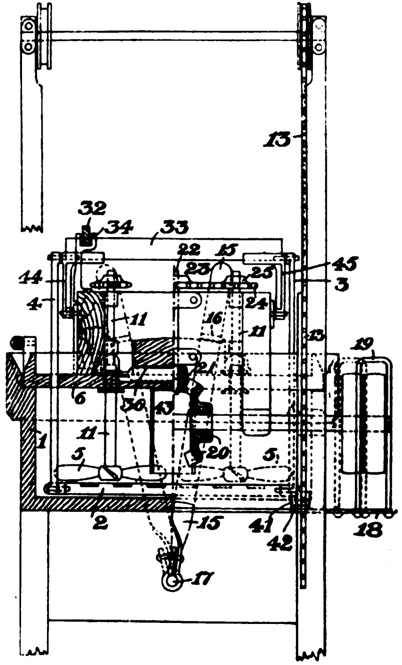


24 which imparts movement to wheels 25 mounted on the upper ends of the propeller shafts 11. To adjust the chain for good driving engagement with all the wheels 25, adjustable chain wheels 26 are provided (fig. 3). The axles of these wheels are mounted on foundation pieces 28 which work as nuts on adjusting screws 27.

"The arms which swing the tray 2 are operated by a connecting rod 32 actuated by a crank disc 31 driven by friction gear wheels 29 and 30 from the driving shaft 12. This connecting rod engages by a notch in its lower surface with the cross bar 33 carried by the arms 3. When the lid is opened, this cross bar comes out of the notch, and the connecting rod 32 then drops on to the bracket 34 mounted on the framework 10 and is moved with this framework.

"Within the bath vertical plates 43 are preferably provided to restrict to a certain extent the action of each propeller to the column of liquid directly above and below it, preventing interference between the currents set up by the different propellers.

Fig. 4.



"The locking lever 15 may be spring mounted to press strongly upon the end of the lid and cause this to lie close against its seat.

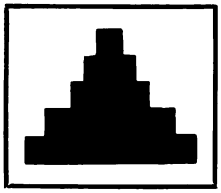
"The parts with which the etch comes into contact are of course made of such materials as will not be injuriously acted upon.

"The detailed description above given is rather to illustrate the invention than to indicate that the invention is limited thereto. Considerable modifications of these details may be made without departing from the invention."

Half-tones by Telegraph.

A VERY ingenious and simple method by which pictures may be sent by code, without any alteration of existing telegraphic or telephonic arrangements, is the subject of a patent (No. 15,734 of 1910, claimed by Antonia Montagna, of Rome). The original picture is copied on a large scale through a half-tone (or similar) screen and then divided into a number of squares, each of the size of one full dot of the picture. It will then be seen that the squares enclose dots of various shapes and sizes, all of which can be classified into some twenty-five shapes and identified by letters of the alphabet. Thus, a white square is Y; a black square is Z; and the vowels represent white squares enclosing various-sized black squares set diamond-way (*i.e.* the corners of the black squares are toward the centres of the sides of the white squares). Thus:—A represents a white square almost filled by a black one,—just the corners left white; E has less black, and larger white corners; in I the diagonal of the inner black square is the same as the length of the sides of the white one, so that the black fits exactly; in O the diagonal of the black square is equal to half the length of a side of the white; and in U the diagonal of the black equals one-third of a side of the white. Other letters represent these black diamonds (or parts of them), set toward one side, or the top, or the bottom of their containing white squares.

For the sake of explaining the method, the simplest possible form will answer. Suppose a piece of paper 7 by 11 inches, on which we draw a black, stepped pyramid, of which the lowest step is 9 inches long, while those above are 7, 5, 3 and 1 inches respectively. There will be five steps, with an inch of blank along the top and another along the foot. If we regard the square inch as our unit, taking Y for white and Z for black, the pattern can be divided into lines one inch deep, and telegraphed thus:—Y11—Y5ZY5—Y4Z3Y4—Y3Z5Y3—Y2Z7Y2—YZ9Y—Y11.



The result might be represented thus:—

Y Y Y Y Y Y Y Y Y Y Y
Y Y Y Y Y Z Y Y Y Y Y
Y Y Y Y Z Z Z Y Y Y Y
Y Y Y Z Z Z Z Z Y Y Y
Y Y Z Z Z Z Z Z Z Y Y
Y Z Z Z Z Z Z Z Z Z Y
Y Y Y Y Y Y Y Y Y Y Y

It will easily be seen that by means of a typewriter keyboard with letters represented by the various hieroglyphs—black squares, white squares, etc.—a picture can be reconstructed, then reduced as in line-block work.

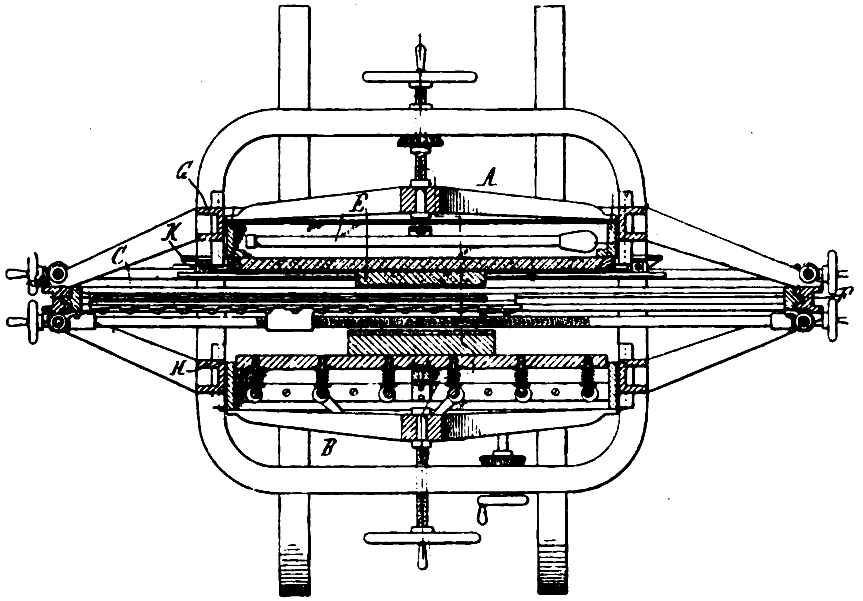


Fig. 1.

A Printing-frame for Lithographic Stones and Plates.

W. C. Huebner and G. Bleisten, both of New York, have patented an apparatus, illustrated in the diagrams herewith, for producing a number of photographic copies on a smooth light sensitive metal plate or stone. The invention consists of a copying contrivance for giving a number of identical copies. The apparatus comprises a stand to hold a light-chamber wherewith to copy a negative or positive easily. Against this light-chamber is a brace or pressure-strut, which presses the sensitised printing stones into firm uniform contact against the surface of the negative. The sensitised

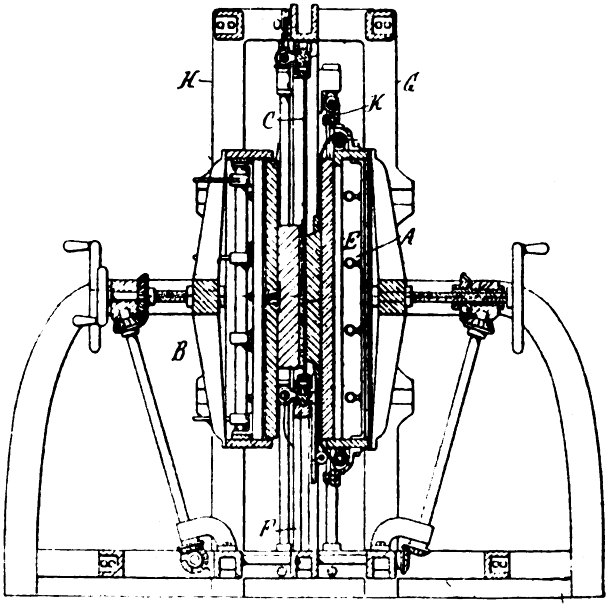


Fig. 2.

plate or stone is laid in a holder placed at right angles to the axis of the light-chamber. The construction can be gathered from the diagrams, wherein is the light-chamber A, and opposite this the pressure-frame B, so arranged that the sensitised metal plate or stone C can be pressed into contact with the negative (or positive) E. The light-chamber is illuminated by mercury-vapor lamps; and the rest of the essential details of the apparatus can be seen from the plan and section diagrams.

Specimens and so forth.

COLOR OFFSET-PRINTS of the greatest possible interest and beauty are being specimened by the American Lithographic Company, New York, who state that they are finding much satisfaction from the use of three Scott offset presses.

A SHEET OF CIGARETTE STIFFENERS containing three hundred portrait cards in ten colors on a sheet 44 x 32 inches is a most effective specimen of work just issued by the A. H. Kellogg Company, of New York. The fine detail and absolute register speak volumes for the construction of their offset press.

AERONAUTICS in a wide sense is the subject of the latest specimen sheet from Garrett & Atkinson. Electros of designs and pictures of balloons (dirigible and otherwise), aeroplanes of various patterns, etc., are offered in various sizes, and should have particular value while human flight is so much before the public.

ALLEN & COMPANY, of 107 Clifton Street, Finsbury, are again specimening their photogravure and its machine-printed companion, to which the name of Allezzogravure is given. The samples in both lines are of very fine work indeed, and it is a pleasure to see the old aristocratic photogravure process handled in such a confident commercial manner.

"SWAIN'S QUARTERLY" is, as always, a fine case of example that is better than precept, of faith shown by works. This firm is doing good for the whole craft by its effective advertising, and it is a satisfaction to note that many other engravers—each in his own way—are giving us "advertisements that advertise." There is still, however, ample room for improvement and for more process houses to emulate the dignity and quality of the "Quarterly" appeal made by Swains.

MAGNIFICENT FRENCH SPECIMENS.—A few months ago we commented upon the delightfully-produced magazine *Chanteclair*, printed by A. Jehlen, 24 Avenue de Saint Ouen, Paris, and now this progressive printer sends an unusually fine portfolio of samples of monochrome, duochrome, and trichrome half-tone. He says:—"We shall be glad if you can aid us in getting into touch with English commercial houses having places in France. Printed matter going into France has to pay heavy duty. We know the refined taste of English houses for *publicité de luxe*, which is why these houses consent to the heavy taxes imposed and prefer to have their printing from the mother-house, perhaps in the apprehension of not finding printing to their taste in France. It is because we are in a position to give satisfaction to this class of clientèle that we make the above proposition." If our assurance that the work sent is suitable for the most exacting commercial purposes will help M. Jehlen in reaching and convincing the clients he wishes to approach, we can make it emphatically and without reservation.

School Notes.

THE LEEDS INSTITUTE (Process and Printing Department) is in the unusual position of having had to refuse many students for want of accommodation.

"TECHNICAL SCHOOLS and their application to our Trade" was the subject of discussion at the November meeting of the Lithographic Artists' and Process Workers' Association, in London.

THE SCHOOL AND THE LABOR ORGANISATIONS have combined in Leeds to run a series of craft lectures, and the opening successes have been great. The lectures are on Saturday evenings; the school is the Photographic and Printing Crafts Department of the Central Technical School (Leeds Institute).

A NEW SCHOOL of lithography and photo-lithography has just been started as a branch of the Mechanics' Institute of Rochester, New York. Two great photographic firms—the Bausch & Lomb Optical Company and the Eastman Kodak Company—have amongst their principals the most generous supporters of the Institute.

THE LEEDS INSTITUTE provided a fine audience of students and of the Machine Minders' Associations, for a lecture on November 5 by Mr. R. B. Fishenden, of the Manchester School of Technology, on "Process Block-making." The illustration of the subject by ingenious demonstration of the steps in the processes, as well as by lantern slides, was quite unusually good.

THE ARTISTIC SIDE OF PRINTING proved a very interesting subject in the hands of Mr. C. T. Jacobi at the Leeds School of Art. Mr. Jacobi's service to printing and to process work does not end with his splendid undertaking, The Chiswick Press, just behind the Patent Office in London, but includes good work for technical education, amongst his other activities being membership of the advisory board of the L.C.C. School of Photo-Engraving, Bolt Court.

APPRECIATION OF JOSEPH GOODMAN.—Mr. Goodman has just resigned his position as head of the process and lithographic section of the Liverpool Technical School, and a large meeting of past and present students, with many of the printers' managers of the city, assembled to present him with a memento and to wish him success in the new field of work he has found in the South of England.

Mr. H. L. Dixon made the presentation on behalf of the students, and said how sorry they all were to lose Mr. Goodman. The full value of his work was only known to those who had been under his able guidance. No teacher could be more enthusiastic in his task, or display more interest in the welfare of his students. The Liverpool School had been the only one in Great Britain where a student could go through all phases of the craft under one teacher—from "Camera to Machine." This was why so many of the old Liverpool students were now filling important posts in various parts of the world. As an evidence of respect many old students in different parts of the kingdom had voluntarily tendered their quota to this presentation. They could not allow Mr. Goodman to slip away from them without showing their gratitude and esteem by offering him some token of their great regard by which he could remember them in after years. On behalf of both old and new students, he asked Mr. Goodman to accept of their present—a very handsome heavy silver tea and coffee service, inscribed: "Presented to Mr. Joseph Goodman by past and present students, as a token of their esteem and regard, 1910."

Mr. Rignall (litho manager) said he was extremely pleased to take part in these proceedings, as he had known Mr. Goodman longer than any of them, and appreciated the value of his friendship. He had travelled with him as a journeyman in various parts of the kingdom during their younger days, when they were undergoing their "wander years" in the craft. He wished him every success in his new position, and trusted that he would be as successful in it as he had always been in Shippingopolis.

Mr. H. Conway, another printers' manager, then made a personal presentation of a pipe and case which, he remarked, would help to keep their old friendship green whilst the owner of it was blowing out clouds of smoke in happy meditation on their long fellowship.

Other students had already made presentations of oil paintings, a case of cutlery, etc.

Mr. Goodman assured them that he should always cherish their kind words, as well as the handsome presents they had given him. They would be treated as heirlooms in his family. Although he would soon be far away in the Sunny South, he hoped to be able to greet them on many future occasions, so that auld acquaintance should ne'er be forgot. He should still retain a keen interest in their welfare.

Mr. Goodman's new sphere of activity lies in the application of lithography to fabric printing, on cotton, silk, calico, sateens, etc., as well as on wall-paper, oil-cloth, and similar surfaces. He is undertaking very big things, and if he attains the success that will surely be wished by our readers, they will hear of his achievements from time to time through our pages.

Publications.

"Metal Plate-printing" is a thoroughly worth-while text-book of metalographic and offset printing, that has reached its second edition. Price $2 from *The National Lithographer*, 150 Nassau Street, New York.

Advertising publications kept in print by A. Bourne & Company, 73 Ludgate Hill, London, E.C., and always freely at the service of buyers of blocks, are:—"Bourne's Art Album," "White Letter Blocks," "Embossing on the Printing Machine," "How to Print Half-tones," and "A Range of Half-tone Screens."

Photomicrography, the latest Wratten & Wainwright booklet, though not intended for the "process" man, should be usefully suggestive to all who undertake the photographing of contrasted colors. It is full of information, with illustrations and a demonstration that are admirably designed and selected for their purposes.

"The Graphic Arts," a new monthly devoted to the highest achievements of the printing and process crafts, is announced for January 1, 1911, by the National Arts Publishing Company, 200 Summer Street, Boston, Mass. The editor will be Mr. Henry Lewis Johnson, who has just resigned the editorship of *The Printing Art*, which he established in 1903, and which has been recognised as the most luxurious of printing-trade periodicals. Amongst the first contributors will be J. Horace M'Farland, writing about photographically illustrated work; and the prospectus announces that special prominence will be given to the reproduction processes. Offset and other photo-lithography, intaglio printing up to date, color-photography and color-reproduction are all to have early and complete demonstration. The annual subscription is to be $2·50 in the U.S. and Canada, and $3 to other countries in the Postal Union.

Press photography is of the utmost importance to photographers and process engravers alike, and the most important section of press work is *The Photography of Moving Objects*, which gives title to a good practical book by Adolphe Abrahams, F.R.P.S. On the principle of proving faith by works, the author uses a large number of his own pictures in illustration, with the result that the reader must feel confidence in following a guide who has such experience. No book has attempted to give so many and such practical hints on how, where, and when to photograph moving objects, and it is unusual for a writer to give the reasons for his dicta so clearly and convincingly. To anyone intending to excel in snapshot work the possession of this book should mean the saving of much time, many plates, and a multitude of disappointments. (Price 1s. net. London: Dawbarn & Ward, Ltd.).

Business.

The Photo-Spectrum Company of New York has just been incorporated with $10,000 (£2000) capital to run a color-photo-litho business.

Mrs. Angell, of Vancouver, British Columbia, is one of the few women who personally control and manage photo-engraving businesses. She is said to run hers very well and successfully.

Larger and more commodious premises are necessitated by the increased business of Philipson, Son & Skilleter, who accordingly have moved to Lisle Street, Newcastle-upon-Tyne. Not only is the new place much larger and more conveniently arranged, but it is also much more accessible to most of the customers than the old address in Westgate Road, for it is just off the busy central Northumberland Street. The firm makes a specialty of producing as well as reproducing illustrations, and has an excellent versatile staff of draughtsmen and photographers. The reproduction work, in many different processes, is thoroughly good.

A bankruptcy order, on the debtor's own petition, was made in the matter of Mr. H. G. Phillips, 9 Gough Square, London, E.C. First meeting of creditors, November 9; public examination, December 9.

At the meeting of creditors on November 9, the official receiver reported that the accounts lodged with him showed liabilities £417 (unsecured £321) and assets valued at £69. The debtor's turnover during the past six years had averaged £1300 per annum, but his business had greatly declined owing to general depression in the printing and publishing trades. Four years ago he was forced to leave his premises in Red Lion Court, and no doubt the business had suffered by the change. Owing to pressure by creditors, he convened a meeting and offered a composition of 6s. 8d. in the £, payable by instalments. This offer was accepted, but the debtor was unable to carry it through, and consequently filed his petition. The failure was attributed to bad trade and heavy rental expenses. In the absence of any proposal the case was left in the hands of the official receiver to be wound up in the ordinary course of bankruptcy.

Brevities.

AN OFFSET-PRINTING PROCESS was printed in London as long ago as November 12, 1846, by George William Jacob, of Hoxton.

A FIRE destroyed the premises of the Hub Engraving Company, Boston, Mass., on October 11. The damage is estimated at $30,000 (£6000).

PENROSE & Co., LTD., are agents for the Rotary Cut Surfacer of the National Perforating Machine Company, which we noticed and illustrated in a recent issue.

TRANSFERS FOR OFFSET AND LITHO PRESSES are amongst the specialties undertaken by Philipson, Son & Skilleter, in their new premises at Lisle Street, Newcastle-upon-Tyne.

THE MENPES PRINTING Co., LTD., is being wound up in voluntary liquidation and the business transferred to the Menpes Printing and Engraving Co., Ltd.

THE "POTTER" OFFSET LITHO PRESSES will be handled in Britain by the Universal Typecaster Company, 56 Ludgate Hill, London, E.C., which has secured sole agency for the British Isles.

MACHINE-PRINTED PHOTOGRAVURE is receiving an ever-increasing amount of attention, the latest evidence of which is the application for provisional patent (No. 25,915 of 1910) for improvements in machines for printing intaglio plates by Donald Cameron-Swan.

THE SQUARE INCH as the unit ofc harge for zinc and copper plates has remained in use but a very short time with those houses that adopted it. They are now making their prices "per sheet," of various standard sizes.

"ORDNANCE MAP PRINTING" was the subject of a most instructive lecture by Capt. H. Riall Sankey, M.I.C.E., given as his presidential address to the Association of Engineers-in-Charge, at the St. Bride Foundation Institute.

A. BOURNE & COMPANY mention in a recent circular that the efficiency and condition of their acid-blast etching machine so greatly impressed Mr. Levy when he was in England that he had it photographed as the best-kept machine he had seen in Britain or America.

THE LEAGUE OF MERCY, Strand District, gave a matinee of "The Dollar Princess" at Daly's Theatre on November 3. The league is under the presidency of Mr. and Mrs. Carl Hentschel, with Mr. George Edwardes as vice-president, and its object is to support King Edward's Hospital Fund.

THE REMOVAL OF THE CENSORSHIP IN PORTUGAL, as a result of the revolution, is leading to rapid increase in publications and illustrations. No doubt our manufacturers of printing and photo-engraving machinery are awake to the fact, as our American and German competitors have shown that they are.

AN "ARTIFICIAL ATMOSPHERE" is obtained in Continental establishments working fine collotype, and especially those doing the magnificent color-reproductions that sell as separate prints at high prices, and *The Inland Printer* advises its readers that such an atmosphere is essential to commercial success with collotype in America.

CONGRATULATIONS to Mr. Guy Sears and Miss Margaret Souter Lawson, now Mrs. Sears. Guy is the son of "High Light" Sears, and Margaret is the daughter of the late David Lawson, proprietor of the Lawson Rope

Works, Dundee. They were married in New York, where Mr. Sears is helping his father in high-light lithography.

MODERN THREE-COLOR is described by *The Ben Franklin Printer* as one of the greatest successes of the modern art of printing. This journal encourages its readers to push the use of trichromy, not only for book-illustration and fancy decorative work, but more especially in the way of reproduction direct from the objects for the illustration of catalogues and price-lists.

THE I.P.E.U. had a most satisfactory report at the recent annual convention, showing memberbership 3577, receipts for the year $30,044 (£6009), and a bank balance of $44,112 (or nearly £9000). In every direction the report was good, every figure was a "record," and a scheme for the technical education of the members was discussed hopefully and at much length.

THE COMMERCIAL ARTIST who works up originals for half-tone is the subject of a long article by *The Pacific Printer*, which says that printers do not know so much about him, nor use his services so largely, as they ought to do. The *P.P.* thinks that if the possibilities of working-up and of designing were better known to printers there would be a much larger demand for half-tone work.

CLIVE, SHARMAN & COMPANY, process artists, of 146 Fleet Street, London, E.C., ask us to remind the trade that they are always ready to undertake drawings for process and litho. They have a staff large enough and clever enough to ensure originality and variety; and suggest that even firms which have their own staffs might increase the versality of their work by employing the active brains and hands of Clive, Sharman & Company.

INKS FOR ALL CLASSES OF PRINTING formed the subject of an address by Mr. A. J. Rowley to the November meeting of the Printers' Managers' and Overseers' Association in London. The inks for trichromy received a good deal of attention, and special mention was also made of inks suitable for the most modern tin-printing and other offset methods. While most of the time was devoted to pigments, oils and varnishes received their share of attention, and the practical interest of the subject was attested by a good discussion, in spite of the exhaustive nature of the address and the late hour at which it was finished.

CHARLES E. DAWSON, well known as a poster artist and a teacher of designing, is devoting all his spare time to aviation, and his wife, Miss Gertrude Robins, is just as keen. An aeroplane to Mr. Dawson's design has just been completed in his studio at Naphill, near High Wycombe; another, for his wife's use, is nearing completion at Mullingers in Long Acre, and a third, of passenger-carrying capacity, is under construction in Northampton.

THE PHOTO-ENGRAVERS' ASSOCIATION of St. Louis gave a luncheon on October 9, 1910, in honor of the engravers from a distance who were in town in connection with the American Printers' Cost Conference. The chair was taken by Mr. B. J. Gray, of the Gray-Adams Company, and after luncheon there were "shop" talks by Messrs. Benedict, Hubert, and Prescott, of Chicago; Gage, of Battle Creek, Mich.; Bush, of Louisville, Ky.; and Pawly, of St. Louis, Mo.

ANDREW H. KELLOGG, the offset press pioneer, was invited the other day "to a complimentary luncheon to be given to a mutual friend." He found seventeen of his customers present, who explained that he was the "mutual friend" for whom the luncheon was arranged, and who presented him with a valuable watch, suitably inscribed. It is not often that a process man's *customers* thus conspire to do him honor, and when it does happen it signifies a splendid state of feeling.

THE FISH-GLUE ENAMEL recommended by Mr. G. Ogden, head of the process department of the Boston *Globe*, for use with an etching machine, is published in a tractate just issued by the Graphic Arts Company of Philadelphia, makers of the Levy acid-blast machine. It consists of—

Ammonium bichromate - -	300 grains.
Citrate of iron and ammonia -	65 ,,
Lepage's fish glue - - - -	5 fl. ounces.
Water - - - - - - -	12 ,,

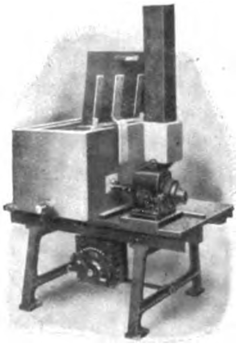
CHARGE AGAINST A "PROCESS" MAN.—*The National Lithographer* brings a charge of misrepresentation against Mr. W. J. Wells, of the Binner & Wells Company, Chicago, who write an article in *The Inland Printer* to show that letterpress half-tone was superior to offset-lithography. They say that he had an edition of 20,000 copies printed from his test plates, then sent them to the offset man to print another 20,000 copies for comparison. The fair thing, they say, would have been to let both begin with new, unused plates.

Honest Forgers.—The Chicago police have just captured Nicaraguan bank-notes to the weight of 700 lbs. in a printing-office. The printers state that they and the engravers acted in good faith, producing the notes for a gentleman who was introduced to them and guaranteed trustworthy by an old regular customer. They supposed him to be a duly authorised representative of the Nicaraguan Government. The judge committed both printer and engraver, as well as Nicaraguan customer, to the grand jury, but while the Nicaraguan was held on very high bail, the others were released on quite light recognisances.

The Rotary Cut Surfacer, which we described and illustrated recently, is being placed on the British market by Linotype & Machinery, Ltd., 188 Fleet Street, London, E.C. It is made by the National Perforating Machine Company, Kansas City, U.S.A. The manufacturers point out that the new mechanical principle introduced into this machine is generally recognised as infallible, viz.: that the best means for obtaining a true, flat surface is by use of a lathe. This principle has undoubtedly been well applied, with fine material and workmanship. The Cut Surfacer is not only recommended to block-makers as capable of improving their mounts with some reduction in cost, but printers are advised that an economy of cost and of storage-space may be made by creating a habit of dismounting their blocks and using the wooden bases for any new blocks of the same size, or cutting them down for smaller ones, meanwhile surfacing both sides of the wood.

On the Continent.—A correspondent who is very well known in the trade, and who has had exceptional opportunities of studying process and printing conditions in Holland, Belgium, and Germany, writes:—"I differ greatly from the bulk of what has been written as to the premier position held by Germany, especially in the scientific, technical, and educational branches of the printing craft and process. I am much disappointed. I had been led to believe that things were GREAT; instead of that I found them very ORDINARY. I cannot understand the gross inaccuracies and mis-statements that have been made repeatedly. On my first visit I came to this conclusion, but did not feel justified in stating it; after a second long and wide tour of inspection and going deeply into the question, the opinion is confirmed that some of the continental publicists—especially the Germans—have rushed into print on too small pretexts. The technical schools disappoint one particularly—even the great Charlottenberg, which one had regarded as the Mecca of technical education. On examining deeply, it proves to be really a huge military barracks, called a school for courtesy."

The "Mark Smith" Etching Machine up to Date.—This machine has recently been the subject of some very nice improvements. As shown by the illustration, a substantial table is now provided, mounted on iron standards which are kept well underneath the table to prevent their being splashed by the acid. These standards keep the table absolutely rigid and make it impossible for the bearings to get out of alignment. No cast aluminium whatever is used in the construction of this machine, the whole of the working parts being constructed of rolled metal of guaranteed 98 per cent. to 99 per cent. purity.



An improved type of lid has been constructed by which the easiest access to the plate is obtainable, while, as shown in the small illustration, an aluminium hinge is fitted to the lid so that the latter can be left open whilst adjusting the plate-supporting bars. A speed controller has also been fitted.

The makers, Messrs. Hunters, Ltd., report very satisfactory business in this line. They have on order at present over twenty machines, and find orders coming from all directions.

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A. COLINSKY.

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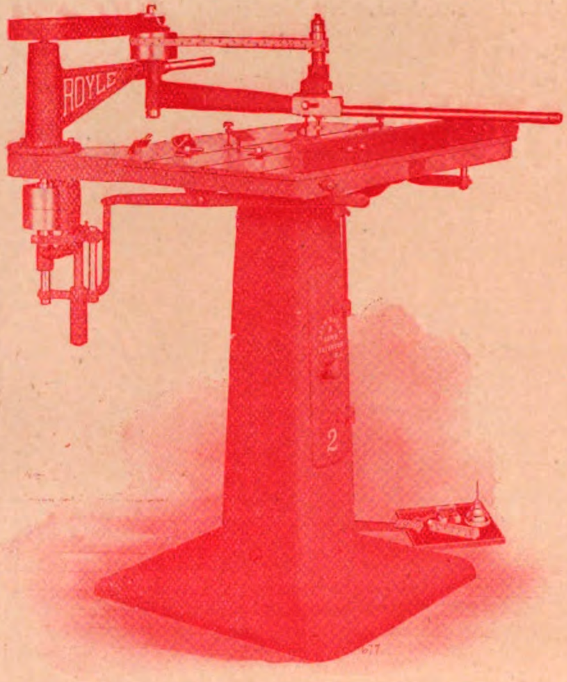

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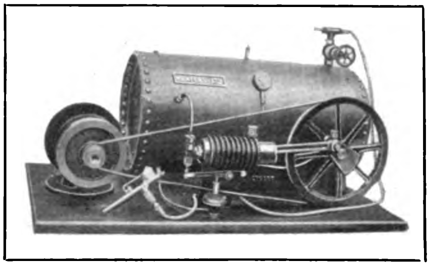

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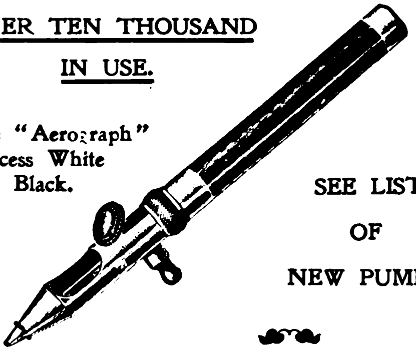

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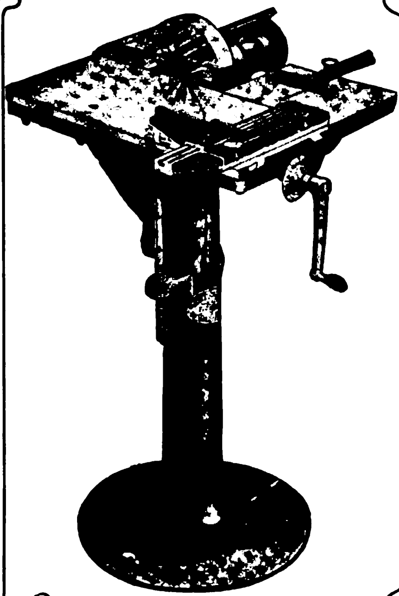

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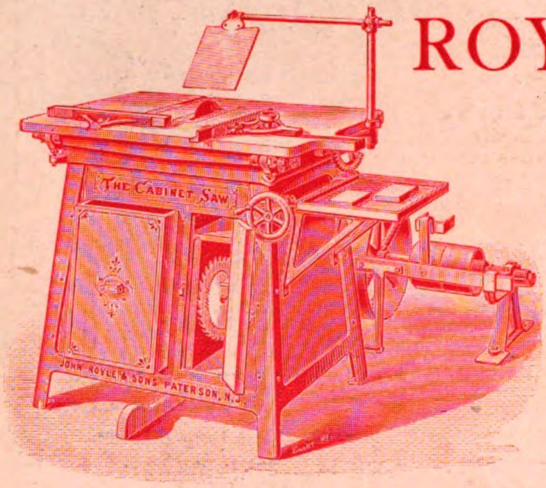
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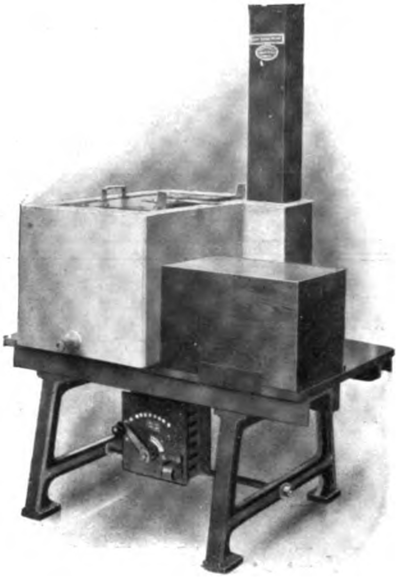

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